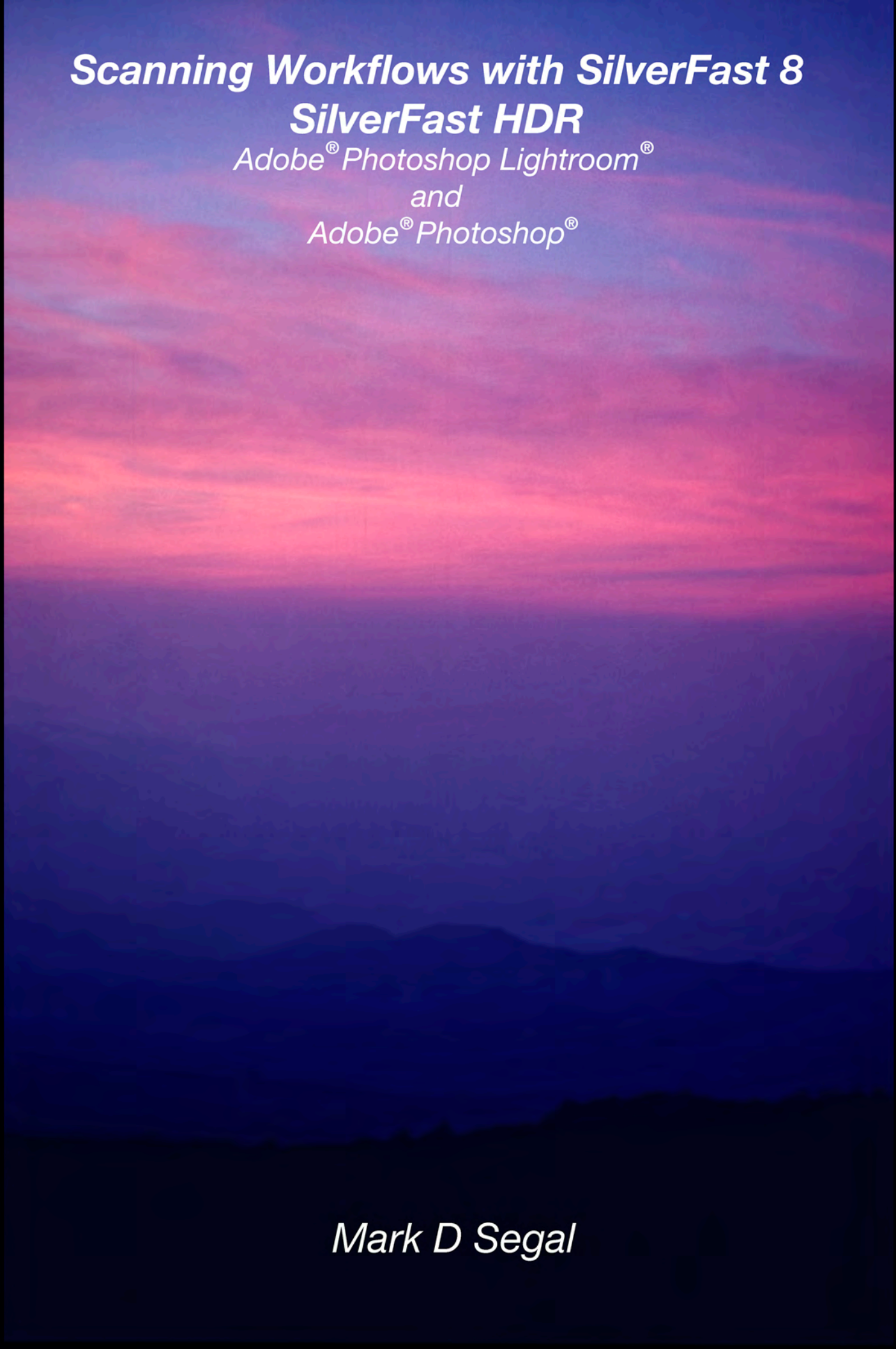
Scanning Workflows with SilverFast 8
SilverFast HDR

Adobe® Photoshop Lightroom®
and
Adobe® Photoshop®



Mark D Segal

The Key Things People Ask About Scanning Photos (and Where This Book Deals With Them)

Should I scan prints or the film originals of the prints?

If you have the film, always prefer the film. The prints don't contain nearly the amount of resolution and tonal quality you can reproduce from the film, whether positive or negative.

OK, but then what scanner do I need – a flatbed or a dedicated film scanner?

You can use either. The quality of the scanner is a foremost consideration – its actual resolving capability, the quality of the lens, the quality of the assembly, the quality of the sensor. These days, there are surprisingly good scanners on the market at surprisingly low cost. Generally speaking, a very good dedicated film scanner will deliver better image quality from film than a very good flatbed scanner. As this book is about using software and not a guide to buying equipment, please do your own research from reputable sources on current equipment offerings. I discuss the resolution of several scanner models in Chapter Five.

What's Changed Between SilverFast 6 and SilverFast 8?

A lot – both application engineering and the user interface. The WorkflowPilot is a major innovation providing a speedy and easy workflow from start to finish. This is covered in Chapter One, and in detail in Chapter Ten.

Before I Start Scanning Anything, SilverFast Offers Three Versions – How Do I Know Which to Buy?

It depends on which features you think you need or can do without. This is also covered in Chapter One.

How Do I Navigate the User Interface, Set It Up and Use It the Way I Like?

Also covered in Chapter One.

I Understand I Can Use SilverFast to Scan and Edit Photos, but I Can Also Edit Photos in Lightroom and Photoshop. What's Best to do Where?

This is one of the most frequently asked and debated questions in web forum discussions about editing scans. It is covered extensively in this book. Needless to say, it is best to know what you intend to do where before you do anything; there are things you must do in the scanner software, things you are well –advised to do in the scanner software, and other things that are totally optional. This is covered extensively right up-front in Chapter Two, and with worked examples in Chapter Ten, Appendix 4 and Appendix 5.

SilverFast Has Quite a Few "Preferences" Users Can Fine-Tune to Their Needs. Should I Set My Preferences Before Scanning, and If So, How?

Yes – it's best to set these preferences before you scan, so this is covered up-front in Chapter Three. Unfortunately, there are concepts of digital image editing that you should understand in order to make informed choices about some of these settings; therefore as needed, forward references are provided to the Chapters where these concepts are covered.

I've Heard About SilverFast HDR, but I Have No Idea What It Does or Why I Should Have It – Can You Explain?

Yes - "HDR" is SilverFast's answer to those who want an "archive scan" that they can store in a steady state indefinitely, and edit and re-edit at will without degrading any image information and without needing to rescan the image – much like the philosophy of the raw image from a camera as treated in Lightroom or Adobe Camera Raw. The use of HDR is described in the workflow options in Chapters Two and Ten.

It's Very Important that What I See on My Monitor is What Emerges from the Scanning Process. How Can I be Assured of That?

Getting predictable tone and colour between monitor, scanner and printer is the subject of "Colour Management". Certain settings and procedures are necessary for colour management to work properly. SilverFast does much of this "under the hood", but there are concepts and steps you the user should understand and implement before making scans. Hence, this is also covered up-front in Chapter Three and further in Chapter Ten for hybrid workflows.

OK, Now that I'm Ready to Start Scanning, I Need to Load the Photo and Get It into the Format I Like – How Do I Do That?

Several things are needed at this stage to prepare the photo for scanning: selecting the media you are scanning (is it film or paper?), making sure that its orientation is correct (Portrait or Landscape, managed by rotating, flipping if back-to-front), and deciding what material from the photo you wish to include in the scan (cropping). All of this should be done before you scan, and best before you perform edits on tone and colour (so that the tone and colour edits are focused only on the material you will retain). All these adjustments are explained in Chapter Four.

I Hear All Kinds of Things About How Much Resolution I Need – or Don't Need, What Bit Depth the Images Should Have, What File Sizes I'll End-Up With? How Do I Know What It All Means and What to Choose?

I explain all that in Chapter Five, including how to configure these options in SilverFast.

I've Heard that Cleaning Photos of Dust, Scratches, Other Debris and Reducing Grain is Tedious and Degrades Image Quality – Is That True and How Do I Deal With It?

No, it's not necessarily true and it's not hard to deal with. If your scanner has an infrared channel, SilverFast has a wonderful tool called **iSRD** for identifying and eliminating dust, scratches and other debris. SilverFast also has a grain mitigation tool; but for this you have options to use other tools in Lightroom or Photoshop. All grain mitigation causes some loss of acuity, but it needn't be much and it can be compensated with well-controlled sharpening. This is all covered in Chapter Six.

My Photo is Formatted and Cleaned-Up, But I Don't Like How it Looks – How Do I Improve Brightness and Contrast?

SilverFast has a number of tools for doing this, each with their own purposes. These are all explained and illustrated in Chapter Seven. You may also make these types of adjustments in Lightroom or Photoshop. Some of it is nonetheless worthwhile doing in the scanning application before scanning. This is all explained in Chapter Seven.

Even with Colour Management Properly Set-Up, My Photos Have a Colour Cast, or Certain Colours are Wrong. Why Is This, and How Do I Fix It?

If your colour management is properly set-up, you should see colour that is wrong in the original media faithfully reproduced on your monitor, in the scan and in a print. This is a job for colour correction, not colour management. SilverFast and other applications have great tools for global and selective colour correction. These are explained in Chapter Eight.

What's the Easiest Way of Getting a Colour Negative Converted to a Good Colour Positive for Scanning?

Colour negatives can be tricky to deal with because there are so many emulsions each with its own characteristics, including the tone and hue of the "orange mask" that need to be dealt with. Fortunately, SilverFast has an excellent solution for this called **NegaFix**, which is the easiest and best way I know of for converting and scanning negatives. This is one subject of Chapter Nine and Appendix 4. It does a great deal "under the hood", but for those curious to know how one makes these conversions successfully without using **NegaFix**, several ways of doing that are also explained in Chapter Nine. My recommendation is to use **NegaFix**.

Is It Best to Do a Colour to Black and White Conversion in SilverFast, or in Post-Scan Applications?

Numerous approaches will do the job well. Because this is a book mainly about SilverFast, the way to do it in SilverFast is shown in some detail, but other approaches are covered too, also in Chapter Nine.

You've Described All These Components of Scanning – Can You Walk Me Through the Processes From "A" to "Z"?

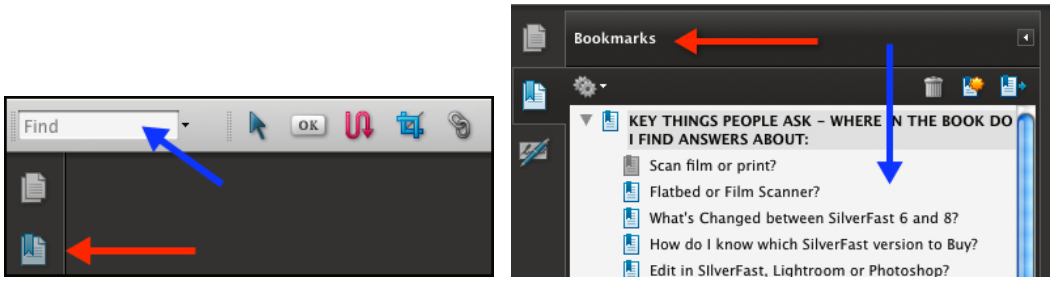
That's the purpose of Chapter Ten. The first thing covered there is the **SilverFast WorkflowPilot**. It's a great new approach in SilverFast 8 for guiding you through a complete scanning sequence in logical order from start to finish. Then the chapter gets into the manual approaches with SilverFast alone, or SilverFast combined with Lightroom and/or Photoshop for the more adventurous.

Do I Need to Sit Through All the Time the Scanner Takes to Scan the Photos, or Is There Some Way of Automating the Process?

SilverFast has a batch scanning capability that can scan each frame as adjusted individually and it will then send each scan to its own designated folder on your hard drive. Chapter Eleven explains how to do this for supported scanners.

Finally, how do I find stuff that I want to know quickly in this book?

The book is a searchable, indexed and bookmarked PDF document. In Adobe Acrobat or the free Acrobat Reader, click on the upper left-side icon identified by the red arrow in the left image and it will open the Bookmark menu shown in the right image.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KEY THINGS PEOPLE ASK – WHERE IN THE BOOK DO I FIND ANSWERS ABOUT:
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Flatbed or Film Scanner?
What's Changed between SilverFast 6 and 8?
How do I know which SilverFast version to Buy?
Edit in SilverFast, Lightroom or Photoshop?

The bookmark menu is an index of every chapter and major topic in the book. Click on one of those titles (right image, blue arrow) and you will be taken to the page where the topic begins. Alternatively enter an expression in the **Find** pane (left image blue arrow) click **Enter/Return** and you will be taken to the first place it appears. Also, two icons will open by the **Find** pane allowing you to click forward or backward to the next or previous place where that expression appears.

NOTICES

For Readers in a Hurry to Start Scanning with Minimum Fuss and Bother

Please click this link: **SilverFast Workflow Pilot**.

It will take you directly to Chapter Ten, where you may follow the **step-by-step** procedure for guided scanning. I do, however, recommend that you first read Chapter One to get an overview of features and the application interface.

However, if you wish to fully understand the "whys" and "wherefores" as well as the full richness of all the possibilities this software offers, please start from here.

"Basic" and "Advanced"

Users will approach scanning with different needs and different levels of knowledge about the field of digital imaging. This book is meant to be useful to a broad audience, including those who wish to optimally integrate the use of SilverFast with other image editing applications – Adobe Photoshop and Adobe Photoshop Lightroom, for which additional considerations apply. Rather than trying to strike "balances" that involve compromises, I am addressing a wide range of needs and interests, based on my knowledge of the software and of the issues that people raise over and over again with Customer Support and in various web forums. Hence, there are topics covered here that will interest mainly advanced users with more demanding requirements, and which other users may prefer to skip. I preface such sections with a statement in blue: "**Only if you need to know**……", and I indicate the start and end of such sections with an icon that looks like this: . Furthermore, the "**step-by-step**" sections are titled and bookmarked for your convenience. Click on the appropriate bookmark and you will be taken there.

There are features under development

This book was being developed while SilverFast 8 (SF8) and SilverFast HDR were in pre-release or initial release status. It is up-to-date with the software as of April 2012. As the software evolves through "dot-releases" with added features and improvements, this book will be up-dated accordingly. Your purchase of the book entitles you to a free download of each up-dated version. For example, the software now includes a print utility called **PrinTao**. It existed in SilverFast 6 and is under re-development for SF8. You may access it in the current version of the application; however it is not described in this version of the book because it is being improved. For now I recommend printing your scans from an external image editor. Likewise, "lamp control" for Nikon film scanners is under redevelopment and it too will be covered in an update when the feature ships.

Introduction

This book is for anyone seeking to learn efficient workflows for maximizing image quality from scanned media. I concentrate most on film scanning, because scanning film enables far higher resolution, better tonal rendition and better colour quality than obtainable from scanning prints of the same photographs. The techniques discussed for film scanning are largely applicable to print scanning, but I note the differences where they occur. In the application, film media are called "Transparency" and prints and other paper media are called "Reflective".

Unless they informed themselves, today's children could go through life never knowing that film dominated photography until about a decade ago, so rapid, pervasive and successful the digital revolution has been.

Yet there remain devotees to film technologies always interested in improving the quality of their scanned images. As well, countless numbers of people have archives of negatives and prints. They should seriously consider scanning these collections before they deteriorate to a state where expensive or time-consuming restoration could be needed to bring them back to acceptable quality for enjoyable viewing. This book is aimed primarily at these audiences.

The alternative to doing the scanning oneself is to send all the media to a commercial scanning service. The basic product the good providers deliver is acceptable to many people and the cost of their basic service packages can be surprisingly reasonable. For people with little time to spare, this may be the obvious solution to their scanning needs. However, for those who can commit the time and wish to control the processes for maximizing image quality themselves, mastering good scanning workflows is the preferable approach. I demonstrate workflows in this book delivering results that could require costly custom services if obtained from commercial providers, and probably require considerable iteration between the client and the service provider.

Why a new book on scanning now? This book accompanies the introduction of SilverFast 8 (SF8). SilverFast has millions of users worldwide. SilverFast Ai6 was introduced back in 2002, the company decided to be eclectic and by-pass SilverFast 7, hence we now have SilverFast 8, which needs its own documentation.

LaserSoft Imaging (LSI) has been listening to its customers' issues and suggestions, and computer operating systems have changed. Therefore it became necessary to completely change the application's code and structure "under the hood" and to rebuild it from the bottom-up. This provided an opportunity to much improve its user interface and operating efficiency and to create the framework for more easily adding new features. Having worked with this renewed application from its beta phases through commercial release, I believe SilverFast 8 is the most comprehensive, efficient and user-friendly scanning application on the market.

As well, since SilverFast Ai6 was introduced, there have been major changes in Adobe Photoshop, and the introduction of Adobe Photoshop Lightroom. Some aspects of these complementary applications introduced new possibilities for scanning workflows, described in this book.

In this volume, I provide clear, detailed instruction, complemented with copious illustrations (that you can enlarge by zooming in Acrobat Reader), on how to use SF8. (I do this from the Mac version, but mention Windows-based examples where they differ substantially.) The most pervasive systemic difference between Mac and PC relevant to the material in this book is that the CMD key on a Mac is the CTRL key on Windows, and the OPT key on a Mac is the ALT key on Windows. I use the Mac terminology for convenience. Windows users should simply translate CMD for CTRL and OPT for ALT wherever they arise. Another systemic difference is the name of the colour management module in the computer's operating system. In Mac it is called **Colorsync**, in Windows it is called **ICM**. For Windows users, when I mention **Colorsync,** think **ICM**.

I also provide **step-by-step** instruction (bookmarked by subject) on how to implement alternative workflows within SF8 and between SF8, SilverFast HDR, Adobe Photoshop and Adobe Photoshop Lightroom. There are three versions of SilverFast and some features are not supported in every scanner. All instruction in this book is feasible in the **Ai Studio** version for all features your scanner supports. The details of some instruction may need adaptation with respect to some features in SF8 **SE** and **SE+**, but the underlying principles are common to all versions.

This book is not only about "what" and "how", but also "why". I explain some factors underlying the processes described, to the extent necessary for better using them. I think it important that you understand why you make particular settings, and why various settings have the impacts they exhibit. This helps you make more intelligent choices in how you use the software. I emphasize, however, that this book is directed primarily at operations rather than theory. **If you are in a hurry to start scanning without reading all this stuff, I recommend nonetheless that you read Chapters One, Two and Three, then skip directly to Chapter Ten.**

A word on how the book was written: this is a rather unique collaborative undertaking between LaserSoft Imaging and me, a long-time SilverFast user and reviewer, and the first external tester of SF8. There's been lots of dialogue between us and I hope this has strengthened the book; but I am responsible for the content.

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A word about how the book is organized:

I address a number of objectives in this volume. First and foremost is how to use SF8. Next is giving you a conceptual understanding of the scanning and editing choices you can make, explaining alternative ways of scanning and editing that place varying degrees of emphasis on the use of SF8 complemented by Photoshop and Lightroom. There are many angles to scanning and editing a scan because there are a variety of approaches and applications from which to select, each having their own relative merits.

With all of this in mind, the organization of such a book is necessarily "non-linear"; but basically, both the key tasks needed for scanning and the corresponding organization of the book are logically sequenced like this:

1. The SilverFast concept and application version differences.
2. Understanding and managing the application interface.
3. Understanding what items and tasks are more or less scanner-related.
4. Deciding up-front what you will do in which application.
5. Setting up the workflow structures enabling those decisions.
6. Choosing your SF8 scan Preferences.
7. Choosing your SF8 colour management options.
8. Loading the image into the scanner and adjusting the scan preview to suit.
9. Dealing with resolution, bit-depth, print size, linear dimensions and file size.
10. Image grain reduction, clean-up and sharpening.
11. Making adjustments to image tonality (brightness and contrast)
12. Making adjustments to colour (colour balance and selective colour adjustments)
13. Handling Conversions: Colour to Grayscale (Black and White) and Negative to Positive.
14. Workflow strategies step-by-step from A to Z
15. Automation (batch scanning).

I hope this book will help you derive maximum benefit from using SF8. I wish you all happy reading and successful scanning.

Mark D. Segal

May 2012

Cover Photo © Mark D Segal
View from Mount Kilimanjaro, January 1971, sunrise. Kodachrome. Scanned in a Nikon Super Coolscan 5000 ED scanner with SilverFast 8, August 2011.

Acknowledgements and Legal Stuff

This project would not have been possible without the active collaboration of key team members at LaserSoft Imaging who devoted considerable time and advice to assist with the technical aspects of the material in this book.

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Notwithstanding advice and assistance I received from LaserSoft Imaging, it is more than usually important to clarify that all the demonstrations of procedures, opinions, findings and observations expressed in this book are mine and mine alone, regardless of whether LaserSoft Imaging supports them or not, and there is no implied concurrence from LaserSoft Imaging for any of this content. I am intellectually responsible for the content. Given that SilverFast 8 exists in several versions and the multiplicity of scanners, processes, media and operating systems in use, neither I nor LaserSoft Imaging accept any responsibility or liability whatsoever for the accuracy or usability of the material in this book.

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Chapter One
Background Information about SilverFast 8

1.1 The SilverFast Concept of Scanning Software

The basic philosophy underlying SilverFast is that it should be a comprehensive, customized and efficient set of tools for digitizing film and reflective media to the highest achievable quality for supported scanners. I discuss below how SilverFast 8 is Comprehensive, Customized and Efficient, in that order.

Comprehensive

This means that the SilverFast approach gives users all the basic tools needed within this one application for digitizing the media to a high standard of quality without recourse to an external editor.

Amongst others that I mention in their appropriate context, SilverFast incorporates a number of especially powerful tools that are very useful in a scanning workflow:

Multi-Exposure is a tool that increases the dynamic range of the scanner by making two scans at different exposures and blending them, such that as much detail with as little noise as achievable is rendered in the shadow areas of positive media or the highlight areas of negative media (Chapter Seven).

The **Neutral Pipette** is a highly effective tool for correcting colour casts in one to four clicks depending on your version of the software. It is by far the easiest and often sufficient way to colour-balance a scan (Chapter Eight).

The **Descreening** tool is used to mitigate the visibility of the printing screen that often interferes with clear scans of pages from newspapers and magazines that all require such screens for laying down ink on paper (Chapter Six).

Selective Color to Gray (SC2G) provides for flexible and attractive brightness and contrast adjustments to scans of colour media being converted to black and white. It works by allowing the user to adjust the individual brightness of each of six colour groups that underlie a black and white image (Chapter Eight).

Treatment of Kodachrome: Getting good results easily from scanning Kodachrome has always been a challenge because of the unique chemical properties of this emulsion. Scans often tend to emerge with a bluish cast and the film is known to resist certain traditional tools for dust and scratch clean-up. SilverFast deals with both of these problems by providing scanner profiles specifically tailored for colour interpretation of Kodachrome (Chapter Three), the ability to make custom Kodachrome profiles (**Ai Studio**) , and with the **iSRD** tool (Chapter Six), which provides very efficient infrared detection of dust and scratches on Kodachrome.

Use with Other Applications: SF8 can be used cooperatively with Photoshop and Lightroom[1], so that those applications' tools can be deployed quite seamlessly on completion of the scan.

Lightroom can be used as a complementary editor for a SilverFast scan; however, because there is no direct link between SilverFast and Lightroom, migrating images from SF8 to Lightroom requires a bit of setting-up, which I explain in Chapters Two and Ten.

Of course, many of the image-editing tools in SF8 also exist in other applications, including Photoshop, Lightroom and third-party Photoshop plugins. This often raises questions about which edits are best performed in which application, a subject to which I devote much attention from Chapter Two onward. Hence, this book is much more than a manual for using SF8; it is that, but it extends beyond SF8 to explain the structuring of alternative workflows for scanning and editing images.

Customized

This means that SilverFast maximizes the image quality any supported scanner can deliver, by customizing certain tools for each scanner model as appropriate. For those people trying to optimize image quality at the scan stage this is important, because each scanner model has different performance characteristics and technical specifications, such that various image-editing functions need to be adjusted to the requirements of the specific scanner model for achieving optimal outcomes.

Four key examples of customization within SF8 are lamp control, dirt and scratch removal, scanning colour negatives and colour management of the scanner.

Lamp Control is one of the very few image-editing adjustments actually managing the performance of the illumination system hardware in certain scanners allowing it. This adjusts image brightness by either varying lamp brightness or the amount of time the lamp exposes the film to the scanner sensor, or a combination the two. Because each scanner model is constructed differently, the scanner's response to a Lamp Control setting will not necessarily be the same from one model to another. SilverFast is customized to enable use of lamp control for scanners allowing it. (At time of writing, Lamp Control is not yet enabled in SF8 for the Nikon scanners supporting it; but it will be.)

All luminosity controls are discussed in Chapter Seven.

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[1] Whenever I talk about "Photoshop" and "Lightroom", I mean Adobe Photoshop and Adobe Photoshop Lightroom, both registered trademarks of Adobe Inc.

Dust and Scratch removal is a particular strength of SilverFast, especially for all supported scanners providing an infrared channel. The **iSRD** tool, for detection of dust, dirt and scratches, is fine-tuned for each scanner model to ensure optimal separation of dust and scratches from image detail.

Colour negatives are difficult to scan into good colour positives because it is not possible to make a satisfactory standard conversion profile[2] from negative to positive for all brands, qualities and speeds of colour negative films. They each have unique characteristics and "orange mask" (the masks are not always orange and for those that are orange, the hue varies between films), which means that a separate conversion profile is needed for each film type; otherwise users could spend much time editing the luminance and colours of their scans.

Because of technical differences between scanner models, these negative profiles need to be fine-tuned separately for each supported scanner model. At present, for each supported scanner, SF8 **NegaFix** provides 127 customized profiles and additional customization tools for converting colour and black and white negatives, as I describe in Chapter Nine on **conversions**.

Colour Management is a key area for maximizing the efficiency and quality of the scanning process. The objective of colour management, covered in Chapter Three, is to achieve systematically consistent and predictable image tone and colour between the output of the scanner, the image view on a calibrated and profiled display, the image appearance in a colour-managed external image-editing application, and the final output, be it on the internet or in a print.

Achieving this consistency and predictability between applications and devices requires, amongst other things, the use of scanner profiles to characterize how these devices render tone and colour. Each scanner model renders image tone and colour differently, hence each model needs to be characterized and profiled to put their tone and colour rendering into a known and repeatable state, and to allow for consistent tone and colour rendition between the devices used to create the image. SilverFast provides profiles for Kodachrome, other transparencies and reflective media customized for each supported scanner model. For even greater accuracy, SilverFast's **Auto IT8 Calibration** tool (**Ai Studio** version) creates bespoke profiles for the user's own scanners at the push of a button. SilverFast IT8 targets are needed for this process. No other software known to me at time of writing provides such a customized, convenient and automated approach to scanner profiling.

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[2] A profile is a mathematical characterization of how a device reproduces the tone and colour values for each pixel in an image. I discuss this in Chapter Three.

Efficient

SF8 makes the scanning process efficient in numerous ways.

- All editing is done in **Preview** mode, which allows immediate feedback between editing adjustments and results. With appropriate colour management of scanner, display and printer, the feedback in the preview is a reliable predictor of results, even up to softproofing[3] the image for print.

- SilverFast embeds highly efficient ways of seeing full image and detailed partial image previews without the need to redo time-consuming pre-scans for each situation. **HiRePP** - **High Resolution Picture Performance** embeds a lower resolution preview file within a high-resolution image, so when opening, for example, a 2 GB file in SilverFast HDR, only the lower resolution preview file is opened, which happens very quickly because there is no need to read the huge amount of data in the high-resolution file. Once you finish any image editing with the aid of that preview, the final image processing is done with the full high-resolution data.

- Further on **Previews**, there are five tools for cleaning and sharpening images that require a **1:1 preview** (meaning one image pixel per one screen pixel) to be used correctly. In SilverFast, once this preview is triggered for one filter, it remains available for viewing any section of the image for any of the five filters without needing to repeat pre-scans. This is a huge time-saver.

- SF8s **16bit Histogram** feature is rather unique. Instead of displaying the usual 256 levels of brightness available in an 8-bit representation, with 16-bit representation all 65,536 levels of brightness are represented in each colour channel, allowing for a very refined graphic view of the distribution of image tonal information, made more informative by the fact that the histogram can be floated and stretched across your display.

- The settings for any one image can remain "sticky" from image to image, such that editing similar images in a series is either not required, or needs only marginal "tweaks".

- A **batch scan** of a series of images can be set-up and launched with no further user intervention, discussed in Chapter Eleven.

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[3] Softproofing is a utility in SilverFast and Photoshop allowing one to preview the appearance of the image on paper, taking into account the brightness and hue of the paper, the tonal range of the paper/printer being used, and the fact that photos seen by reflected light look less contrasted and saturated than the same photos seen on a display. Chapter Three describes how to implement it in SilverFast.

- **SilverFast HDR** saves "raw" scans in that state, allowing indefinite, essentially non-destructive re-editing of the image, without the need to rescan the originals. This is discussed in Chapters Two and Ten. One particularly attractive feature of the HDR application is that when using it in **HDRi mode** for infrared -capable supported scanners, one scans the infrared channel into the HDR scan, allowing post-scan dust and scratch detection with the aid of the infrared channel and no need to rescan each time one changes the settings; this cannot be done in Lightroom or Photoshop, as these applications do not see the infrared channel. **Gamma Synchronization** provides for predictable tone and colour between scanner, SF8 and SilverFast HDR. The advantages and use of **HDR** are woven into the treatment of many operations throughout the book, but **HDR** gets a special focus in Chapters Two and Ten on workflow structures.

- The new **WorkflowPilot** (demonstrated extensively as the first workflow option in Chapter Ten) provides a quick and easy trip through all the stages of setting up a scan, for those who prefer a guided workflow covering all the bases and basics.

- Finally, the **checklist** feature (found in the ***i*** tool – first item in the SF8 tool column) lets the user review all settings before launching a scan to make sure everything is set as intended, and to store a record of these settings for future reference.

1.2 Major Application Improvements Since SilverFast 6 (SF6)

The user interface is completely revamped. It is now very much more user-friendly. All the program controls are placed in logical sequence, the size of the tool icons has been enlarged to make them more accessible and their operational status more easily seen, the application preferences have become more accessible and simplified, the clarity of context help is improved, and the user workspace is now much more easily customized with the introduction of floating tool panels that can be placed anywhere you wish, or easily re-docked. The whole interface is scalable, which is a huge assist to those working with several related applications at once.

The application code is completely re-written in a programming framework allowing for compatibility with the latest computer operating systems and much easier introduction of new features in future "dot releases" of SF8. While the user will see little evidence of this last change during normal use, the consumer benefit will become apparent as new features are more readily introduced and "dot release" upgrades provided for all supported scanners in the future.

The above-mentioned **WorkflowPilot** is a much expanded and more user-friendly version of the Scan Pilot in SF6. Its interface sports larger controls and intuitive operation, and it allows the user to migrate between a lesser and larger array of

image editing adjustments within each tool, while maintaining an easy and seamless logical progression through all the steps to a final scan.

A number of tools have much improved process efficiency; for example, image preview generation at **1:1** resolution, the use of **iSRD** and batch scanning require fewer steps than previously needed.

The **checklist** feature is much enhanced and more accessible in SF8.

1.3 Support to Legacy Products

A number of important manufacturers (for example Nikon and Minolta) have ceased to produce scanners and are no longer supporting them with updated drivers and editing software. As well, computer operating systems have changed, such that the original drivers for these scanners no longer work with the newer operating systems. These factors started to become problematic for the use of legacy scanners with the migration from Power PC to Intel PC for Mac OX and, left unattended, could create further problems for the migration from Snow Leopard to Lion in the Mac environment. Likewise, certain drivers working in 32-bit Windows XP do not work in 64-bit Windows 7. Both Mac and PC operating systems now allow 64-bit computing, provided that the device drivers also support it.

SilverFast 6 (SF6) had already up-graded the drivers of legacy scanners to manage the transition from Power PC to Intel-based Macs and from Windows XP/Vista to Windows 7. SF6 also has 64-bit versions. LSI provided these application up-grades as free "dot releases" within SF6 to registered customers.

SF8 includes all the modifications needed to run the application on Mac Lion, Windows 7 and several versions back for each system, as well as scanner drivers for selected supported models needing new drivers that the manufacturers no longer provide.

1.4 Version Differences

You may chose between three SilverFast versions – from richest to the most basic - **Ai Studio, SE+** and **SE**.

The feature list in SF8 is long, so rather than reciting each and every feature in each version, I note the features NOT available in **SE** relative to **SE+**, and NOT available in **SE+** relative to **Ai Studio**. All the features listed below **are** available in the **Ai Studio** version. Features that are NOT available in **SE+** are also NOT available in **SE**. Complete precision here is not feasible, because some features vary from scanner to scanner. I recommend that you read both lists below before deciding on which version is right for you.

SF8 features included in **SE+**, but not included in **SE**:

1. Midtone toggle normal/logarithmic
2. Saturation Toggle Adaptive C
3. AACO (Auto Adaptive Contrast Optimization)
4. Multi-Exposure
5. Selective Color Correction Hue Slider
6. Unsharp Mask Full Dialog
7. Kodachrome Profile Embedded
8. Support for JPEG2000 file format
9. PrinTao

For scanners offering all three levels of the software (most of them, excluding the Nikon 4000/5000/8000/9000 models for which only the **Ai Studio** version is available), you need to decide whether the feature differences are worth the price differences. I provide brief explanations of these differences.

1. **Mid-tone toggle – normal or logarithmic**: The ability to toggle the mid-tone slider between normal and logarithmic adds a small amount of flexibility to the impact of mid-tone brightness adjustment.

2. **Saturation Toggle Adaptive C:** In the **Picture Settings** panel, there is a **Saturation** slider that alters the colour intensity of the photo (I discuss saturation in Chapter Eight). As you move the slider from left to right the saturation increases. In the SE+ and Ai Studio versions, there is a switch that toggles between two strengths of impact from adjusting this slider: **A**, which is normal, and **C,** which can put saturation on steroids. In the **SE** version you have the normal impact **A** option. **C** can come in handy for special effects or for dealing with very badly faded photos.

3. **AACO (Auto-Adaptive Contrast Optimization):** This tool is somewhat similar to Photoshop's Highlight/Shadow adjustment layer, in terms of its ability to control the luminosity of shadow areas, while in principle not much affecting mid-tones and highlights. It is available in the **SE+** and **Ai Studio** versions, but not the **SE** version. There are other ways of opening shadows in **SE**, using the Gradation Curve discussed in Chapter Seven.

4. **Multi-Exposure:** Multi-Exposure is intended to open shadow detail not otherwise visible by giving the media a second scanning pass at greater exposure and then blending the two exposures into one composite automatically (Chapter Seven). It has the added benefit of reducing scanner noise when active. This feature is not available in the **SE** version.

5. **Selective Color Correction Hue Slider**: This is a convenient method for altering the hue of a primary colour. Let us take **red** for example. Red is a

combination of yellow and magenta (Chapter Eight and Appendix 1). The hue slider allows one to alter the balance between the yellow and magenta components of red, so that the red varies from magenta, through red to orange and to yellow. The slider can be used to the same effect for altering the balance between the components of any of the other primaries. This slider is not available in the **SE** version, but there are other slightly less convenient ways within the tool of achieving the same results.

6. **Unsharp Mask Full Dialog**: The Unsharp mask is a filter used for sharpening the image. The **SE** version offers fewer refinements over the impact of sharpening, but the basic controls are of course available.

7. **Kodachrome Profile Embedded:** There is no Kodachrome scan mode available in the **SE** version. You may still scan Kodachrome transparencies in the **SE** version; however, it is likely that more colour correction will be needed than necessary if the scan were produced in the **SE+** or **Ai Studio** versions, which do have scanner-specific Kodachrome profiles that automatically load when the Kodachrome scan mode is selected.

8. **High bit formats**: If you need the JPEG 2000 format, the SE version would not be sufficient; but if you don't use the JPEG 2000 format, the absence of this feature wouldn't matter to you. JPEG 2000 is a variant of the JPEG format that provides smaller file sizes than the TIFF format; it does so by using a compression technology that does not sacrifice useful data (called "lossless compression") and it supports 16-bit depth rather than only 8-bit depth (the JPEG standard). Because of these features, a JPEG 2000 file is ideal for storing large images and for transmitting them over the internet at their full quality. (More information on bit-depth is in Chapter Five.)

9. **PrinTao**: This is a printing utility that communicates with your printer and allows for custom image layouts. The selected scan frames appear in the print interface, where they can be sized and positioned. You can add text to the layout. When you click **Print**, the scanner software automatically scans the image with correct colour management and resolution, then hands the result over to the printer driver for printing. The version of PrinTao in **SE+** does not include the text creation and layout capability available in the **Ai Studio** version. At time of writing, it is possible that improvement of PrinTao communication with your printer may yet be forthcoming.

SF8 features included in **Ai Studio**, but <u>not included</u> in **SE+ or in SE**:

Because there is a price difference between the **SE+** and **Ai Studio** versions of SF8, you may wish to decide how important these differences are relative to your requirements. I provide here an annotated list of differences between the two versions, which may help you decide.

1. **Additive/Transparent/Separate switchable display modes**: In **Ai Studio** you have access to three different views of the histogram (Figure 1.1):

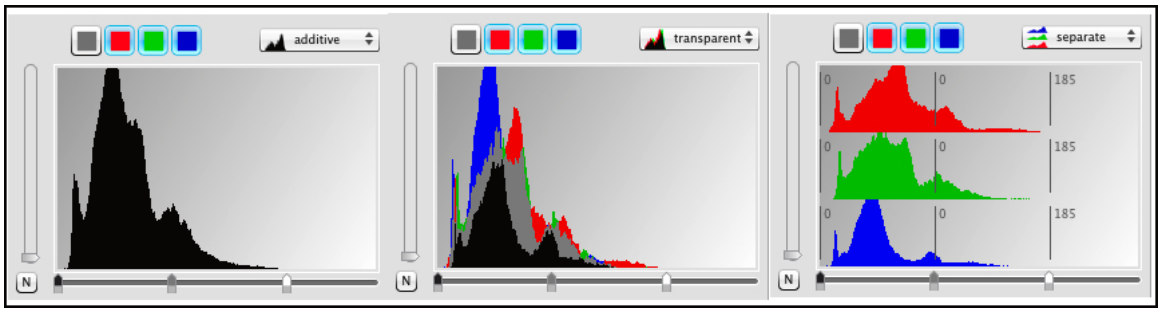


Figure 1.1 Histogram Display Modes

The histogram, fully discussed in Chapter Seven, is a graph of all the tone values in your photo, distributed from the darkest (left) to the lightest (right). It shows you the distribution and concentration of tones along the tonal scale. It is enormously useful for understanding the structure of the photo, the editing it may need, and what happens to it technically as you perform edits.

As a colour photo is made of three channels in a Red-Green-Blue (RGB) colour system, the histogram of each channel can be displayed for a yet fuller understanding of the distribution of the three primaries along the tone scale. In the **SE** and **SE+** versions you get the **Additive** view (Figure 1.1, left) or each individual R, G, or B channel, one visible at a time; in the **Ai Studio** version you also get the **Transparent** and **Separate** views (Figure 1.1, middle and right), showing the individual colour channels overlaid or separated. I often prefer using the **Separate** view to verify whether or not I am clipping away information from the highlight and shadow ends in any of the colour channels while making edits.

2. **Two-level user interface**: In the **SE+** version, some options for a number of the editing tools are not available. Generally, the ones not available in **SE+** are the additional controls provided in the **Expert dialogs** of the basic tools that are provided in both versions. More detail is provided below.

3. **RGB-CMY switchable channels** (see also **CMY Gradation Curve**): This option allows you to edit images using the CMY (Cyan, Magenta, and Yellow) channels rather than the RGB channels. You will miss this option if you scan for pre-press or to a print path using a CMYK raster image processor (RIP), or if you prefer a 0% to 100% tone scale rather than an RGB 0-255 scale.

4. **Color Space compression**: This feature fades the image so that you can use it as background on which to overlay text.

5. **Adjustment of Histogram Width**: This is a convenience feature that lets you expand the width of the histogram to better view the distribution of tones across the range. Histogram is discussed in detail in Chapter 7.

6. **16-bit histogram**: It allows for a more granular reading of luminosity levels in the **Expert Dialog**, because in 16-bit it reports luminosity values in discrete steps of 0 to 65,535 levels per channel rather than the 0-255 levels of 8-bit. This feature, combined with the one just above, is handy for graphically visualizing the impact of certain image adjustments, for example – the effects of using **Multi-Exposure**.

7. **Densitometer: One point instead of four:** The **Densitometer** is a tool allowing you to read the colour and tonal values of any point in the image (Chapter Seven). The **Ai Studio** version allows the user to set four of these in the same image, while the **SE+** version allows for one point.

8. **Densitometer: Available channels:** The **SE+** version gives you the RGB channels. The Ai Studio version allows you to select whether you wish to view the colour information as CMYK, HSL, LCH or Lab values. CMYK is the Cyan-Magenta-Yellow-Black colour model, HSL is the Hue-Saturation-Lightness colour model, LCH is the Lightness-Chroma- Hue model and Lab is the Lightness*a*b* model (wherein a* is the colour value along the green-magenta axis and b* is the colour value along the blue-yellow axis). Chapter Eight and Appendix 1 say more about these colour models.

9. **Output Histogram Display Modes:** The display modes here are the same as the ones in Figure 1s-1 above. All three are available in the **Ai Studio** version, but only the left-most one in **SE+**.

10. **Shift-click adds measurement point for reading in the Densitometer:** This feature, not available in SE+, is helpful for identifying and remembering points of particular interest when making image edits.

11. **Descreening with USM: scalable dialog with previews**: This is an **Expert** feature providing more granularity of control than the presets available in **SE+**.

12. **Expert settings**: In the **Ai Studio** version the editing tools panels have a button sporting the icon of a university graduate's grad-cap. When you click on it, this opens the **Expert** dialogs, where you find the additional control features of the **Ai Studio version**. The **SE+** version does not have these added controls. I mention those where they arise in the explanation of these tools, below. The one exception is in the **Scan Dimensions** panel, where all settings (for setting custom image dimensions) are available in **SE** and **SE+**.

13. **GANE controls not included**: **Power, Threshold and Dark Limit** are not available, leaving you with three basic choices in **SE+**: **Light, Medium** or **Heavy** grain mitigation. While you have the basic tool, the adjustments you can make in **SE+** are less granular – no pun intended.

14. **Global Colour Correction** controls not included: The three sliders for shifting the colour balance between the six primaries are not available, but the same adjustments can be made using the provided colour wheel.

15. **CMY Gradation Curve**: In the **Ai Studio** version you can make tonal and colour balance adjustments (Chapters Seven and Eight) in either the RGB or CMY colour spaces. In the **SE+** version, you have the RGB colour space. You will only miss the CMY option if you intend to scan to a pre-press print path or a print path using a CMYK raster image processor (RIP).

16. **iSRD functions**: in **SE+** it is not possible to add layers for isolating the detection and removal of debris and scratches to certain parts of the image. In the **Ai Studio** version you have up to four layers for this purpose.

17. **Selective Colour Correction - Layering and Masking**: In the **Ai Studio** version the **Expert** Settings gives you a choice between six and twelve colour groups available for selective correction, and you may create up to four separate layers of corrections on the same image. In the **SE+** version you have the one image layer and six colour groups with which to work.

18. **MidPip Neutralizing Pipette:** This is one of SilverFast's most powerful and useful features, allowing you to "white-balance" an image (meaning removing colour casts) in one click or several click operation, provided the image contains pixels that are supposed to be truly neutral gray (Chapter Eight). In the **Ai Studio** version you may set four such points to fine-tune the white balance for near-gray pixels in different areas of the image that you wish to neutralize, whereas in the **SE+** version you have one such point.

19. **Adjustable NegaFix Profiles**: In the **Ai Studio** version you may create and save custom variants from the negative film presets available for converting colour negatives to positive. This customization is not available in the **SE+** version, but the **SE+** version does include LSI's prepared film presets.

20. **Selective Color to Gray (SC2G) Full Dialog**: You may convert a colour photo to Grayscale (Chapter Nine) in SilverFast (**Ai Studio** and **SE+**) by selecting 8 or 16 bit depth, then in the **Selective Color to Gray** (**SC2G**) tool, you can alter the tonality of the photo by adjusting the brightness of each of the six underlying colour groups. The **Ai Studio** version in addition provides for balancing the tone of the grayscale between the R, G and B colour channels underlying the image.

21. **Layering and Masking in SRD**: **SRD** is the tool for removing dust and scratches without the aid of the infrared channel (Chapter Six). In the **Ai Studio** version you may implement different kinds of settings on up to four layers, whereas in the **SE+** version there is only the base layer.

22. **Controls for Unsharp Masking (USM)**: With the basic controls available in **SE+**, you may adjust the **Power, Radius** and **Threshold** of the Unsharp-mask. However, in the **Ai Studio** version, you have added features to exclude dark areas from sharpening, soften the sharpening of shadows, or emphasize the light or dark contour of the sharpening mask, used for fine-tuning the sharpening effect.

23. **Colour Management and ICC workflow:** In **SE+** you are limited to sRGB or ARGB(98) colour spaces (Chapter Three), whereas in the **Ai Studio** version all the working space profiles in your computer are available. Also, printer calibration and RGB/CMYK softproofing are available in the **Ai Studio** version but not the **SE+** version. These two features would be of interest to those who wish to prepare an image that is colour-managed for print from SilverFast alone.

24. **Auto IT8 Scanner Calibration**: A major feature of the **Ai Studio** edition is that you can create profiles for scanning positive transparencies and reflective media customized to the specific tone and colour rendition of your own scanner at the push of a button, using the **SilverFast IT8** target. In the **SE+** version, instead you would use the generic profile LSI provides in the application version for your scanner model. The performance of a generic profile is better than having no profile, but not as good as a custom profile which takes into account the behaviour of your particular scanner. Scanner image rendition can vary from unit to unit, depending on manufacturing tolerances. Some scanner models exhibit more inter-unit consistency than others.

25. **PrinTao Options**: SilverFast includes a print utility for those who wish to print directly from SilverFast. The **Ai Studio** version includes layout and text placement capabilities not available in the **SE+** version.

26. **CMYK outputs:** In the **Ai Studio** version you can produce a final scan with RGB and CMYK colour spaces embedded, whereas in **SE+** the RGB option is available, suitable for most purposes.

27. **Hi-Res Prescan:** Hi-Res prescan creates a higher resolution image preview that offers enough resolution to fill the whole preview area with the image of one 35mm slide from a group in the flat-bed scanner frame. Without this, the hardware would do a re-scan when you zoom the slide from its 35mm size in order to fill the preview space.

28. **Individual Adjustment of all defaults:** This works in combination with **Preferences**, **Frames** and **Framesets**. Chose any settings done in the Preview area and make it the default setting for each frame that is drawn.

29. **Display and editing of IPTC data**. IPTC data is information about the photographer and the photograph you may wish to be stored with the image file. This is possible with the **Ai Studio** version but not the **SE+** version.

30. **Job-Manager**: The **Ai Studio Job Manager** allows you to quickly port the edits of one image to any number of other images being group-scanned in the same job. This procedure is not available in the **SE+** version. However, batch scanning is available in all three versions, allowing you to set individual edits for each image in the frame and then batch-scan them.

31. **Custom settings for Frames and Framesets**: In the **Ai Studio** version you can create, save and store groups of settings for the image or a group of images in a frameset (Chapter Four). This is not possible in the **SE+** version.

32. **Save Custom Defaults:** Enabling this option allows you to save a group of program settings you create as your new default.

33. **Exportable file formats**: In **SE+** it is not possible to export image files formatted in 48 Bit RGB TIFF, 32 BIT CMYK TIFF, 16 Bit grayscale TIFF and 1 Bit Black/White TIFF. Being able to save and export images in one or more of these formats is important for all those who wish to retain scans in high-bit mode, as it helps to assure quality results from further editing and printing in applications such as Lightroom and Photoshop.

Unless you have prior familiarity with scanning processes in general and SilverFast in particular, it may be hard to appreciate whether these feature differences may be important to you. In this case I recommend that you read the sections of this book where the features are discussed in detail, so that you can better evaluate whether or not these differences matter to you.

1.5 Arranging and Navigating the SF8 Desktop

Here are the two default versions of the SF8 desktop, top for the **WorkflowPilot** (Figure 1.2; cyan icon in upper left corner to the left of **SilverFast Ai Studio**), bottom for the **Manual** mode (Figure 1.3; red icon, same location). Tools and locations are the same for both and the whole interface is scalable by dragging the lower right corner in both, but the scan dimensions options are more limited in the **WorkflowPilot**.

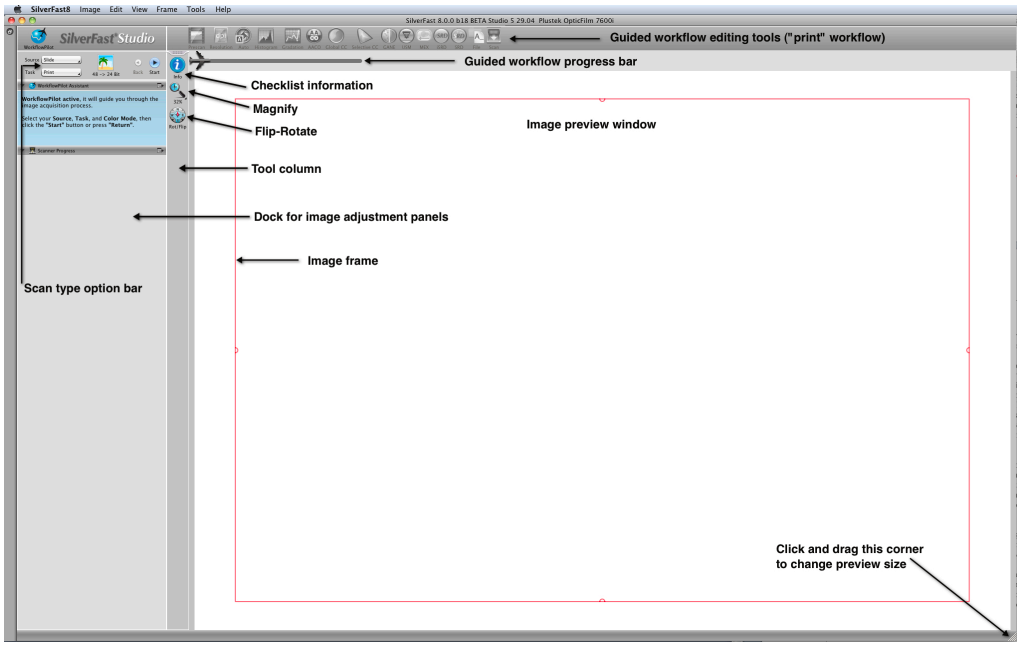


Figure 1.2 Guided Workflow Interface

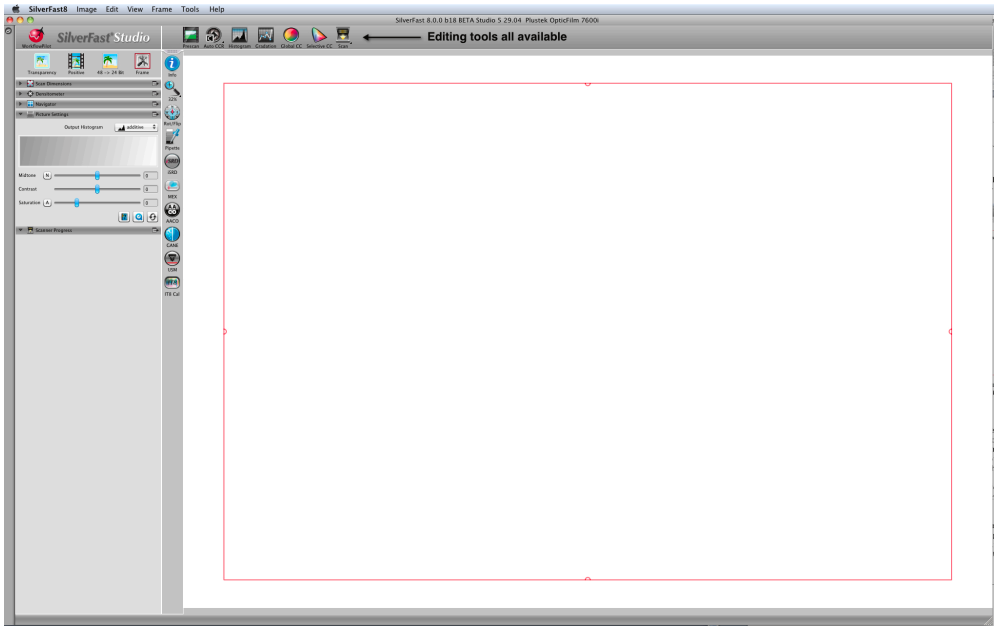


Figure 1.3 Manual Mode Interface

For the **WorkflowPilot mode**, in the default set-up, most of the image adjustment tools are shown as icons along the top ribbon above the preview window (Figure 1.2). If any are missing, they can be added from **Preferences** (Chapter Three). Most of those tools have their own adjustment panels. A tool's adjustment panel will open into the SF8 Dock (left column of the SF8 interface) once you click the **Continue** button (red arrow in Figure 1.4 below); after you do that, the aircraft (blue arrow in Figure 1.4) lands at the icon for that tool.

Figure 1.4 WorkflowPilot Controllers

The Dock is detachable by clicking on the very little button in the upper left corner of the SF8 desktop (Figure 1.5, red arrow). By clicking the button and dragging the Dock's top bar, you can move it to where you wish on your display(s). The column of tools to the right of the Dock is also detachable and movable by clicking and dragging on the small indent at the top of the column (Figure 1.5, green arrow).

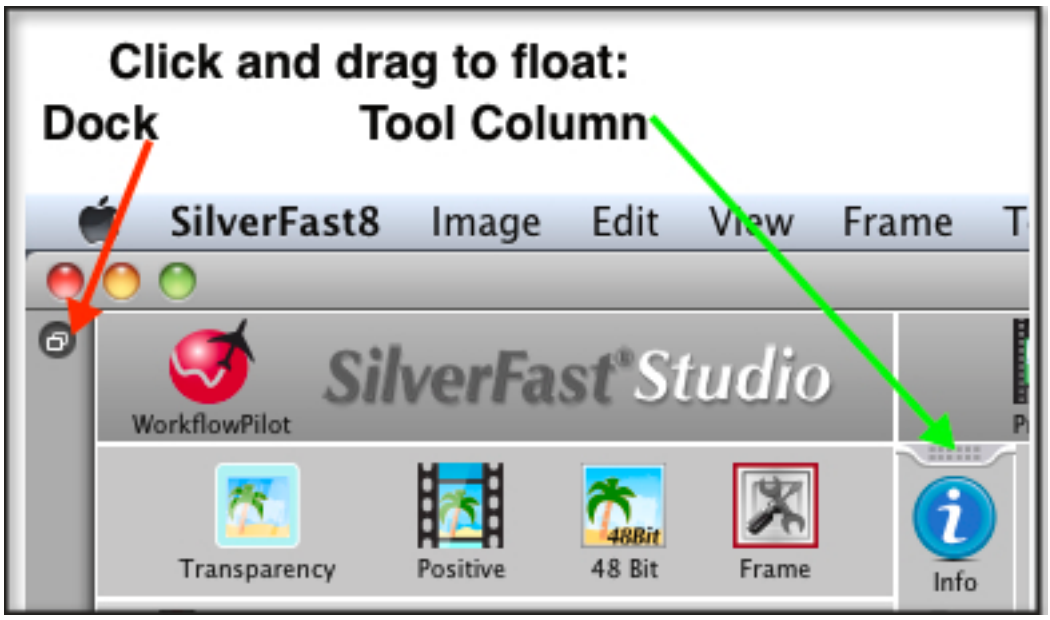


Figure 1.5 Controls for floating the Dock and Column

In **Manual** mode, some of the basic image adjustment panels are nested in the Dock by default, while others will open there upon clicking any of the image adjustment icons located across the top row of the interface or in the tool column – the column headed by the **info** icon (Figure 1.6).

The default **Manual** mode layout is illustrated below (Figure 1.6). (But Dust and Scratch Removal does not appear in the Dock as shown until you click on the **iSRD** icon in the tool column; however, the other panels shown appear as default.)

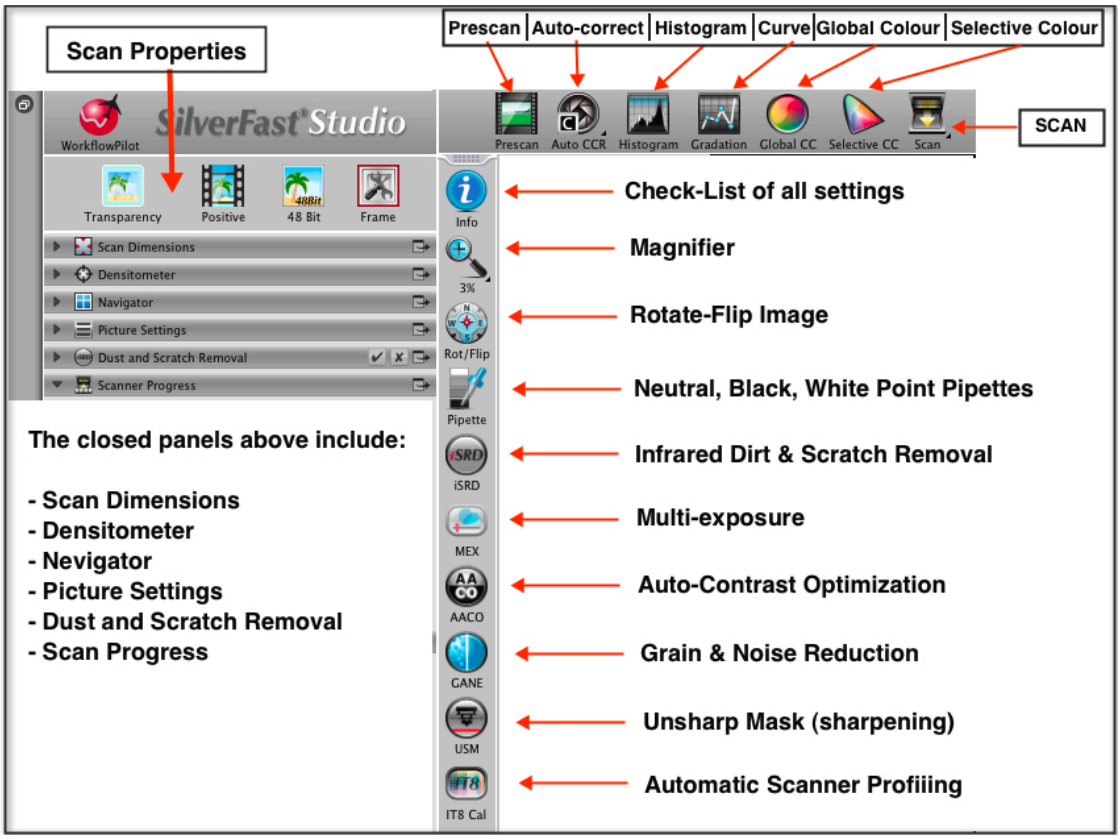


Figure 1.6 Tool Layout in Manual Mode

In both Guided and Manual mode, the individual image adjustment panels can be floated to alternative locations, by clicking on the little "Float" icon in the extreme upper right corner of the pane identifying the panel, (Figure 1.7), and dragging the panel by its identify pane. Panel content can also be revealed and hidden by clicking on the tiny triangle in the upper left corner of the panel's identity pane, (Figure 1.7).

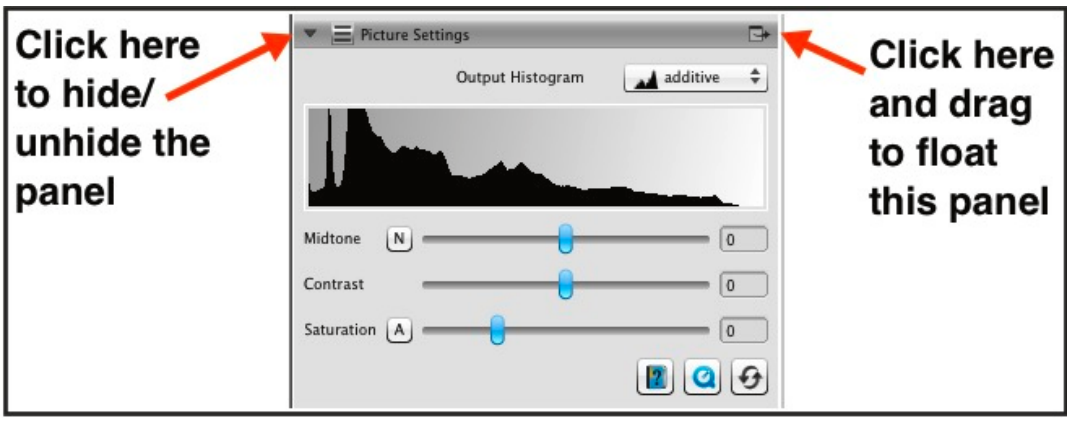


Figure 1.7 Floating and Hiding Panels

Floating the panels could be particularly handy for those who have a dual display set-up, and like to keep as many tools as possible on a secondary display and their image preview on the primary. Click the float icon again to re-dock the panel.

The scalability of the histogram display (Figure 1.7a) is an unusual and welcome feature enabling careful inspection of the distribution of tones along the image tonal scale, including granular portrayal of breaks or gaps signaling tonal discontinuities that are generally undesirable if visible in a photograph.

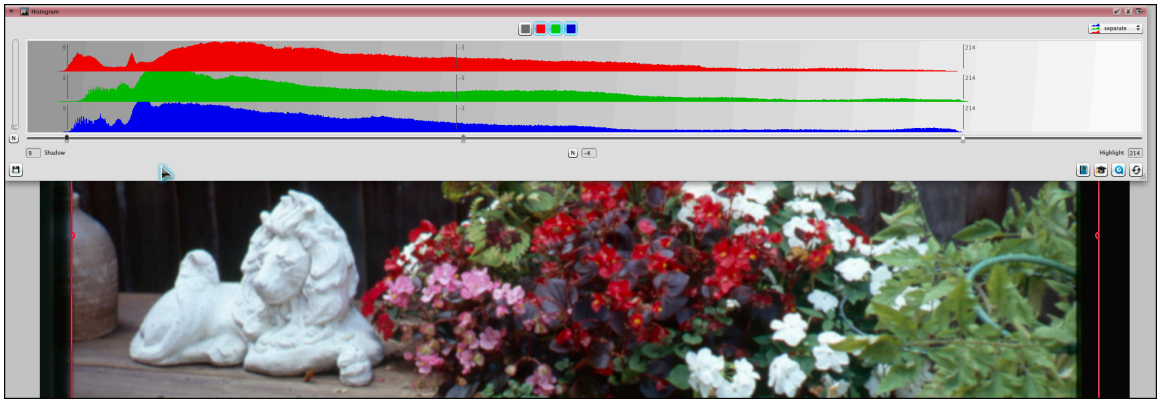


Figure 1.7a Scalable Histogram

The panels that get called into the Dock upon usage (for example Dust and Scratch Removal in Figures 1.6 and 1.8) have two additional panel management controls located in the upper right corner of the panel, shown in Figure 1.8: an **Active/Inactive** switch, and a **Close** switch, operated by clicking on them. If you close a panel, it also deactivates any settings you made in it, therefore if you intend to retain those adjustments, do not close panels before the image is scanned. Toggling **Active/Inactive** is useful to see "before" and "after" effects of edits.

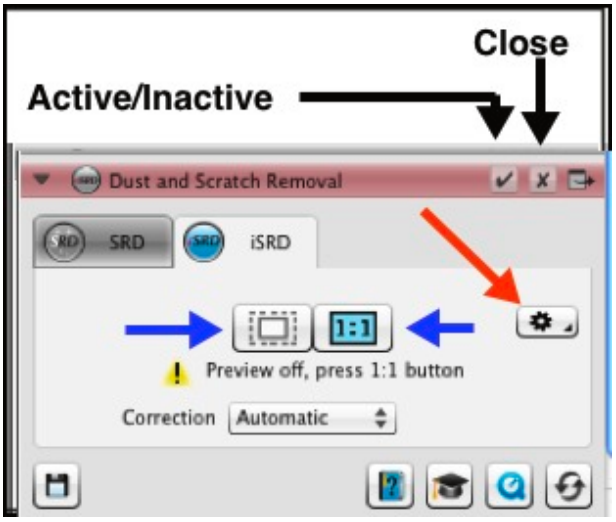


Figure 1.8 Additional Panel Controls

In tool panels that require a **1:1 preview** for obtaining an operational image preview at a scale of one image pixel per one screen pixel (**iSRD/SRD, USM, GANE, Descreening**) there are icons in the middle of the panel for toggling **1:1** on or off

(Figure 1.8, blue arrows). Normally, when you commit to a **1:1 preview**, the scanner needs to make a new pre-scan at this scale. This takes some time, more time the larger the image dimensions. However, in any of these five panels there is an option to trigger an automatic prescan at **1:1** (Figure 1.8, red arrow). If you click on that button, it will pull up a box saying **Autoscan 100%**. If you click on it, after you allow the first pre-scan from clicking on **1:1** in the current tool, for the next of these tools that you open, there will be no prescanning delay when toggling to **1:1**.

1.6 Frames

The **Frame** concept is rather fundamental to scanning as it permeates a number of functions in the scanning process. So I'll begin by explaining what a **Frame** is, then discuss the purposes it serves and how to use it.

A **Frame** is a boundary – identified in red (default colour) delineating either a group of images in a flatbed scanner holder, or each of the individual images within such a holder, or the individual image portrayed on your display from a film scanner. The importance of this boundary is that it defines the area that your scan settings affect. Various settings you make affect the area inside the frame, but not outside the frame. Hence the frame is also the vehicle for saving and applying various settings to more than one image – an efficiency enhancement in those situations where you want the same settings applied to a number of images without having to repeat the same work over and over again. Let us see how that works.

Using my Epson Perfection V750 flatbed scanner, I load the transparency holder with a number of slides and click **Prescan** (Figure 1.9, red arrow). The prescan brings the scanner slide holder into the preview space, and one of the images will have a red frame around it (Figure 1.9, green arrow).

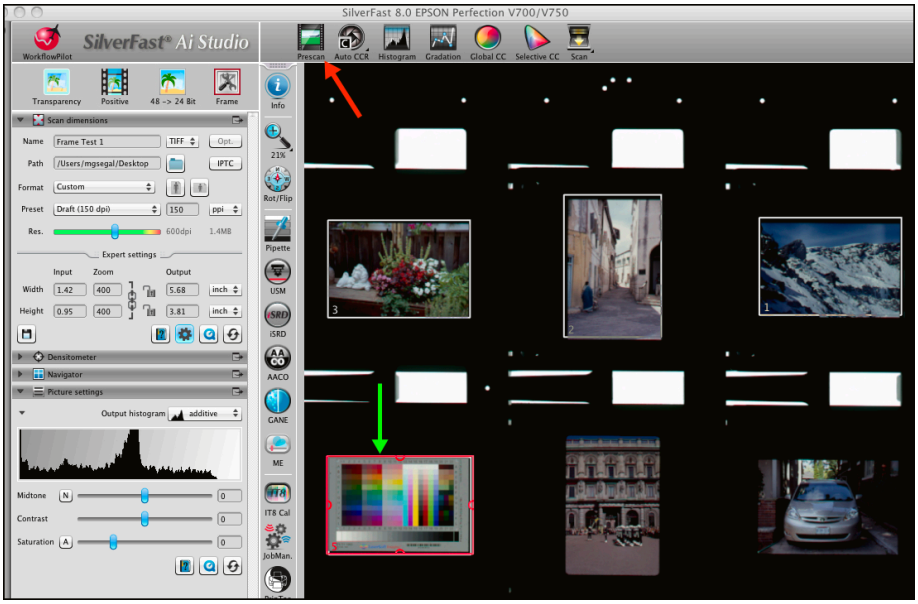


Figure 1.9 Prescan of the Scan Frame

If I hover the cursor over the scan frame, it will turn into a cross-hair (Figure 1.10 red arrow and rectangle). If I click and drag that cross hair over the frame to encompass the images I want included in the scan frame (Figure 1.10 white dashed arrow), it will redraw the red frame boundary to include those images (Figure 1.11); the cursor, when placed inside the frame, turns into a hand with a square hole (Figure 1.11, green arrow) allowing you to move the frame by clicking on the hand and dragging).

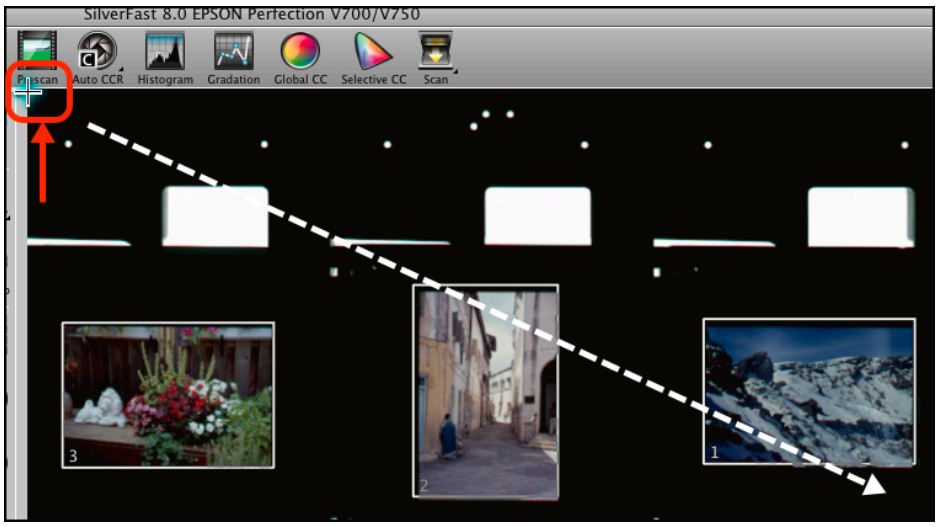


Figure 1.10 Crosshair for Frame Setting

Figure 1.11 Frame Positioned and Movement Control

Figure 1.12 Frame Dimension Controls

I show additional frame dimensioning controls in Figure 1.12. Place the cursor on any of the four boundaries of the red frame and it turns into a two-directional arrow (Figure 1.12, green arrow) allowing you to click and drag that individual boundary to where you wish to place it. Hover the cursor over a corner of the red frame and it turns into a four-way arrow (Figure 1.12, orange arrow), allowing you to re-dimension the adjacent horizontal and vertical boundaries together.

Why select several images, but not the others? The purpose is to effect the same adjustments only to those images – AND ONLY IF the images should have identical adjustments, then scan them as one group. By isolating these images into that frame I can do this. I radically darkened the framed images (Figure 1.13) by shifting the tone curve way down (just for demo here), but those below the frame remain as in their original state (Figure 1.9).

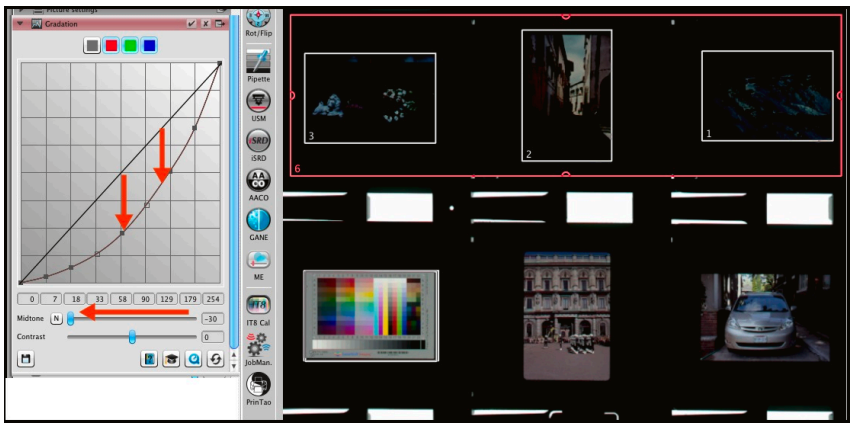


Figure 1.13 Image Adjustments Isolated within the Frame

To make a different set of adjustments (say, brightening) to the remaining images, I draw a second frame around the next group of images in the same way I explained above, and brighten them, leaving the top three intact (Figure 1.14).

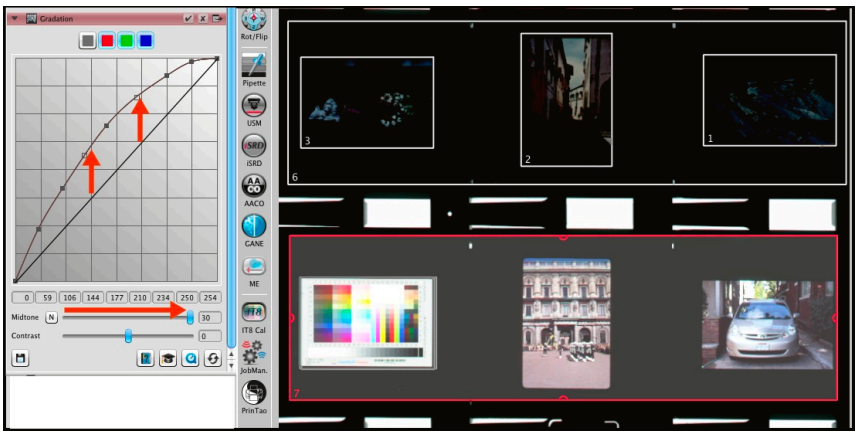


Figure 1.14 Second Frame – Different Adjustments

Following through to demonstrate the use of such a frame (Figure 1.14a), with one push of a dot in the **Global Color Correction** tool (black arrow), I "magenta-toned" a group of three images all at once in one frame to scan as one set. I purposely set a very high resolution (blue arrow, 3200 PPI) for a reason I'll show below. Then I clicked Scan (red arrow), because three images are being scanned in one frame as a group.

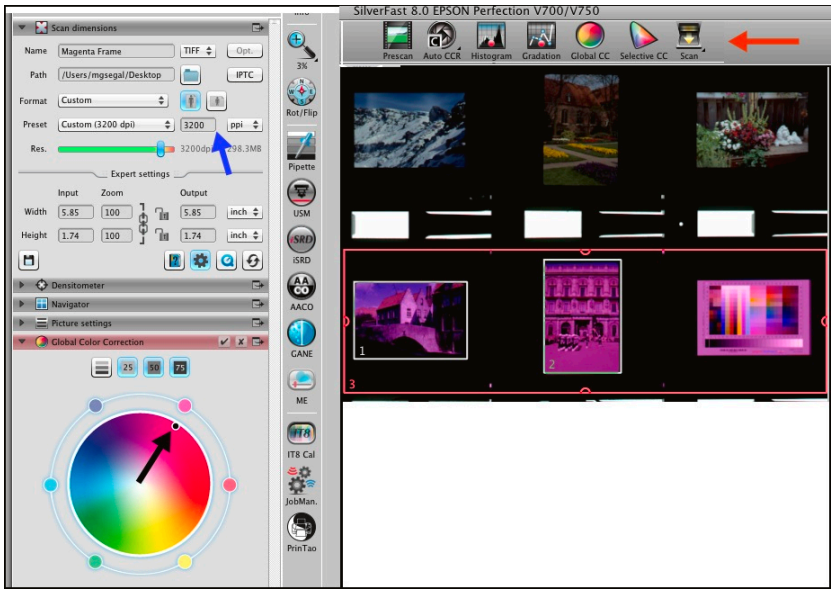


Figure 1.14a One Shot Adjustment and Batch Scan – Three Images in a Frame

It takes a while because the file size will be about 300MB in 24-bit mode (and twice that if I scanned it to remain in 48-bit mode). When the scan is done, it looks like this: (Figure 1.14b)

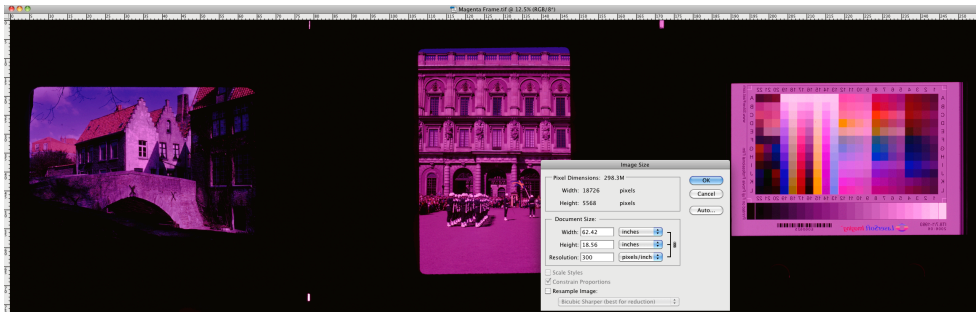


Figure 1.14b Batch Scan Result of the Magenta Images

Pulling up Photoshop's **Image Size** dialog and making sure that **Resample Image** is Unchecked (I want to keep all the pixels), I set resolution to 300 PPI, very nice for printing, and I observe that the total frame, if printed like this would be about five feet wide and a foot and half high. But that's not the intention. The intention would be to separate each image and print it individually from Photoshop. So, for example I extracted the right-hand image, and see that at 300 PPI it would deliver a fine print sized about 14.5 * 9.6 inches (Figure 1.14c)

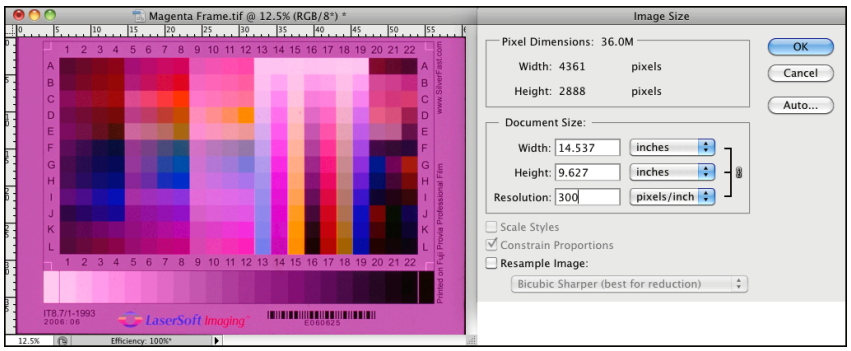


Figure 1.14c Image Extracted from Batch for Printing

While this process is fast and efficient at the scan stage, I don't actually recommend it, because usually one wants to adjust each image individually, as most often their tone and colour characteristics are not the same and they need individual treatment. I only presented this to show one possible use of framing a group of images for identical processing as one set in one file in case it makes sense for you to do so. There are preferable approaches involving **batch scanning** (Chapter Eleven).

As an alternative workflow, you can scan the whole group of images as one set and later on adjust each of them individually and then batch-process them in SilverFast HDR. In SF8, draw the red boundary around the whole set of images as one frame and scan it at very high resolution in HDR mode (Chapter Two, Figures 2.1 and 2.5), then open the scanned frame in SilverFast HDR where you can then frame and adjust each image individually, then batch-process them (Chapter Eleven). **Frames** in SilverFast HDR work in the same way as instructed here for SF8.

Reverting to the functionality of the **Frames** tool, you don't need to manually frame each image if you wish to handle them individually. Click on the **Frame** menu (Application bar to the left of **Tools** and **Help**) (or **Frame** button, top of the Dock) and options drop down, including **Find Frames**. Clicking on it opens a sub-menu of frame arrangements the application can delineate (Figure 1.15). For my Epson V750 Pro 35mm slide holder, I would click on **Slide 35mm Holder** (red arrow).

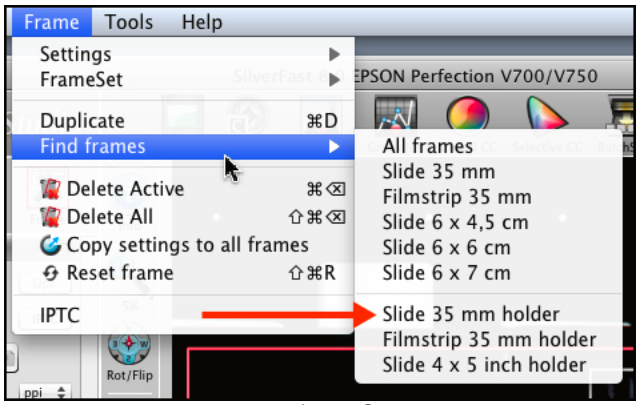


Figure 1.15 Find Frames

When I do that, SF8 places frames around each of the six images in the holder (Figure 1.16); five are white (inactive) and the last by default is red (active frame).

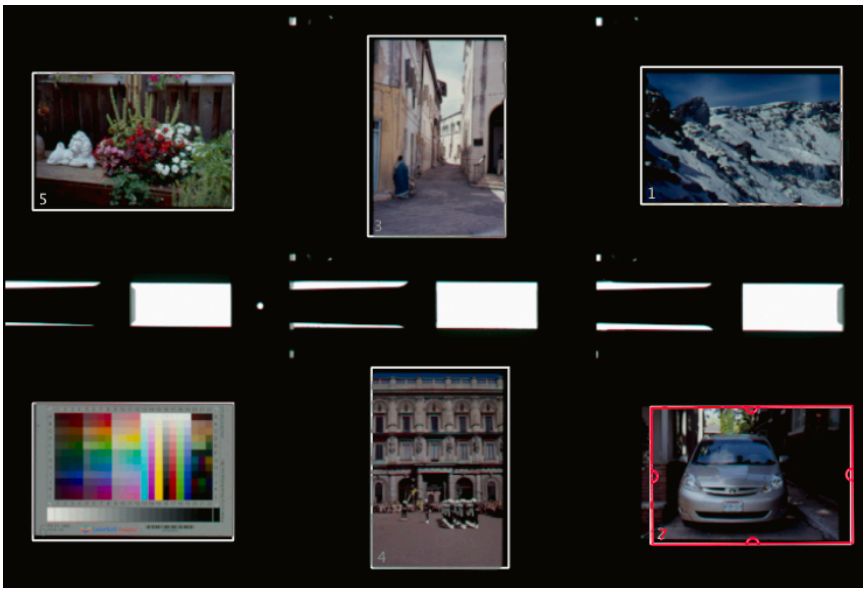


Figure 1.16 Frames Found

Now, I moved the red frame to the upper right image; then, by clicking on the magnifier (Figure 1.17, red arrow), that image fills the preview window.

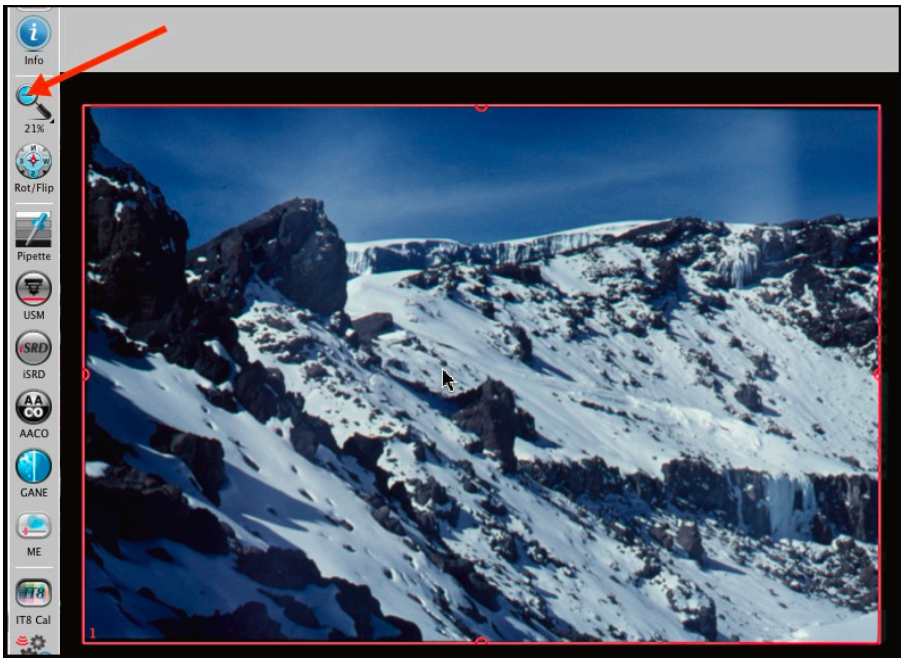


Figure 1.17 Image Magnification

By clicking on the same magnifying glass again, I am taken back to the frame of Figure 1.16 where all the found images are framed. To select another image, I click

on the image to select and the red frame moves there. If the frame needs to be rotated (say because the frame is in Landscape whereas the image is in Portrait), hover the cursor over one of the four semi-circles attached to the frame borders (Figure 1.18, red arrow) until the cursor turns into a hand (Figure 1.18, cyan arrow), then click on the hand and drag the frame around to the correct orientation. This rotates the frame, not the image. Before completing the rotation press and hold **SHIFT** to assure straightness.

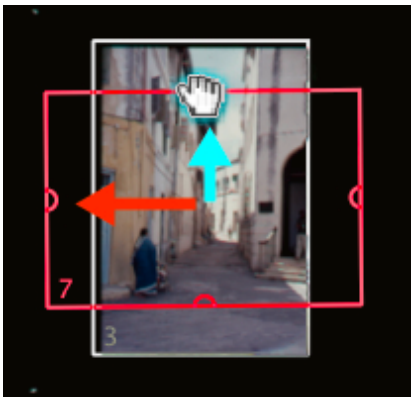


Figure 1.18 Rotate Frame

There are other efficiency-enhancing functions SF8 provides in the **Frames** menu (Figure 1.15):

Duplicate: Clicking on it duplicates the active frame (not the image). Duplicates of the same frame will stack on top of each other. The duplicates carry the same settings as contained in the original frame being duplicated. When you position one of those duplicated frames onto another image, that image will assume the settings of the duplicate frame. Hence, if you duplicated a frame holding an image that was turned magenta, the image receiving this duplicate frame will also turn magenta.

Delete Active: Clicking on it deletes the active (red) frame.

Delete All: Clicking on it deletes all the frames.

Both of the two above will revert to a default frame for your scanner and SilverFast version, if the active frame is the only frame.

Copy Settings to All Frames: You click on this option in order to copy certain settings from the active frame to all other frames to be scanned. For example, in a batch scanning operation, you may wish to replicate the scanning resolution, the file path and name of the destination folder. Then click on this option. Do not click on this option after making any setting intended for this one image alone, otherwise it will be copied to all frames. Make the "in-common" settings first, then click **Copy Settings to All Frames**, then make the frame-specific custom settings (for example tone and colour edits). There is more on this in Chapter Eleven.

Reset Frame: Clicking on this option eliminates all adjustments you made to the image, but retains file resolution, file name and the folder path.

SF 8 **Ai Studio** has additional frame functions: It provides for saving IPTC data. If you click on the IPTC tab, a menu opens for entering data to accompany the scan, including captions, keywords, credits, origin and copyright. In SF8 **AI Studio**, there are also additional functions for saving and loading any settings (e.g. colour and tone edits) done to the individual frame, as well as saving and loading the **FrameSet.**

Saving and Loading Frames and Framesets: You can save your application layout and image settings and reload them any time necessary. To do this, click on the **Frame** menu, click on **Settings**, then click on **Save Settings** (Figure 1.19). A window will open (**Save Current F..**). Type a name for the set you wish to save and click **OK**. To reload these settings, click on **Frame>Settings>Load Settings**; then click on the name of the saved settings that will appear.

The **FrameSet** dialog works similarly for a group of images held in a flatbed scanner frame. It will save all the bespoke settings for each of the individual images in the same frame. The settings it saves are all those that you may have made in any of the tool panels when editing images, as explained just below.

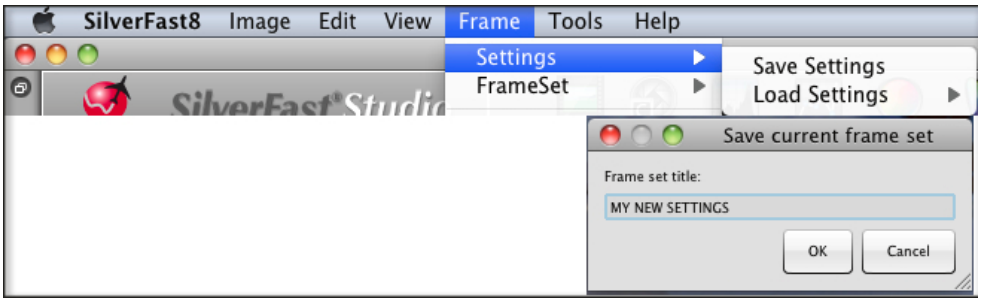


Figure 1.19 Save and Load Settings

1.7 Saving and Loading Image Settings from Image Editing Tool Panels:

In the panels for **Histogram, Gradation, Global Color Correction, Selective Color Correction, AACO, GANE, USM** and **Descreening** (flatbed scanners), there is a **Save** icon at the bottom left of the panel (Figure 1.20, green arrow). Clicking on it opens the **Save current** menu allowing you to save the current settings you made in that panel, by clicking on **Save settings** (top item, blue, in the dropdown menu), giving them a name (in the **Save Current** > **Settings title** pane) and clicking **OK**. SF8 retains the name in the **Save settings** menu along with the associated panel settings. You can apply those same settings to any other image by clicking on the same **Save** icon and selecting the saved settings by the name you gave them.

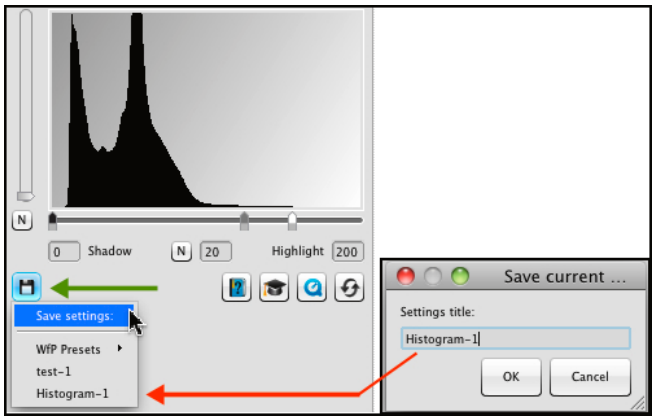


Figure 1.20 Save Image Settings

1.8 Film Offset Adjustment for Film Scanners with Strip Feeders

Some scanners, such as the Nikon LS-5000 (Super Coolscan 5000-ED) come with a film strip feeder to feed unmounted 35mm film strips containing a number of images, the number depending on how the processing lab cut the strip. When this strip is fed into the scanner, the image on the film may not align correctly with the image frame in the scanner, such that part of the image could be cut off and some of the next image shows in the frame when it should not.

To fix this problem, for supported scanners[4] SF8 has a "film offset" controller to adjust the positioning of the image in the scanner. It works like this (**step-by step**).

1. The scanner is turned on, SF8 is opened and the film-strip is fed into the strip-holder mechanism.

2. I click on the **Overview** icon, last icon in the tool column to the right of the **Dock** (Figure 1.21, red arrow).

Figure 1.21 Overview Dialog for Film Strips

[4] At time of writing, the supported scanners are Nikon 5000, Nikon 4000, Nikon LS 50-ED and Nikon LS-40 ED with their respective film-strip holders – SA-21 or SA-30.

3. The **Overview dialog** opens (Figure 1.21 above).

4. Click on **Get/Refresh thumbnails** (Figure 1.21, blue arrow). The scanner ingests the film strip and the icons of the images show in the **Overview dialog** (Figure 1.22).

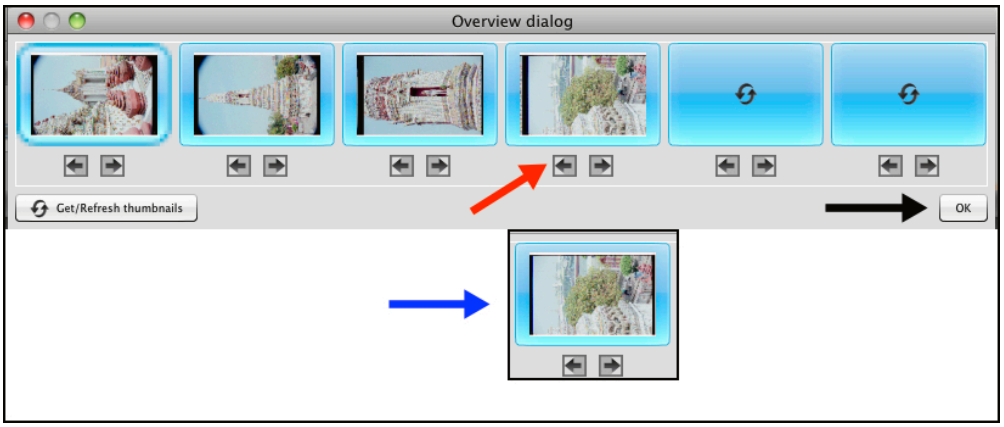


Figure 1.22 Adjustment of Image in Scanner Frame

5. I wish to scan the first image in from the right, but I'm not too happy with its positioning. Perhaps a bit of image is trimmed at the bottom (i.e. the right edge of the frame, as this is a portrait image in landscape orientation where left is top and right is bottom). I need to nudge it leftward to reveal more of what is on the right.

6. So I click on the left arrow underneath that image (Figure 1.22, red arrow) repeatedly until the image icon is positioned within the frame the way I want it. I know it's OK once I see a bit of black film-strip on either side of the image in that frame, as shown in the extract I prepared and placed for illustration at the bottom of Figure 1.22 (blue arrow).

7. Then I click **OK** (Figure 1.22, black arrow) and the frame will prescan into the preview window correctly positioned.

8. You repeat this procedure for each frame you wish to scan from that strip. To eject the film-strip from the scanner, click on the **Eject** icon above the **Overview** icon (Figure 1.21, black arrow).

Chapter Two
The Scanning Workflow Concept

2.1 Early Decisions

"Workflow" simply means "what to do when and where". Scanning takes time. Therefore, I recommend attending to all the critical up-front decisions before committing the scan. The critical up-front decisions include:

- Where you intend to correct the image
- The intended output
- Workflow application choices
- Application Preferences (Chapter Three)

2.2 Where You Intend to Correct the Image: The Grand Overview

All images in a digital workflow, whether from a digital camera or a scanner, need adjustment or correction so that they look the way we want them to look. There is a broad range of choice over whether these adjustments happen automatically or the user controls them. SF8 provides for both alternatives.

Given the number of different image-editing applications now available, the most important perspective I recommend throughout this book is that these applications are complementary, each with its own "time and place" and particular strengths for optimizing the photograph. SF8 integrates with some of them.

I firstly address, in broad outline, the perennial question about which editing operations should be performed within the scanning software or post-scan in an alternative image editor. My experience indicates that the closer the scan itself looks as intended for the final output, the easier and the more satisfactory you will find further image editing in post scan image editors such as SilverFast HDR, Photoshop or Lightroom.

The matter is best understood by disaggregating scan and edit operations into four categories:

(i) Those that depend on the scanner hardware;
(ii) Those that are optimized in the scanning software, because in SF8 they are customized to the characteristics of the user's scanner model;
(iii) Those that are hardware-independent, such that some are best done at the scan stage, while others can be done pre or post scan more or less interchangeably; and
(iv) Image format specification.

I list the items contained in these categories here. I explain how to use them in other Chapters.

(i) Scanner-dependent operations

These operations must be done at the scan stage, because scan quality depends directly on correct use of the scanner, or on scanner-related adjustments that cannot be simulated either at all or nearly as effectively in the post-scan workflow.

- Lamp control, lamp brightness or analog gain (all mean the same thing; supported only on some scanners, for example Nikon 5000);
- Multi-Exposure;
- Focus settings or autofocus (for some scanners);
- Infrared scan for dust and scratch removal (**iSRD** and **HDRi**);
- Aperture settings (in certain drum scanners)
- Wet-mounting of film media for optimal sharpness.

(ii) Hardware-optimized operations

It is preferable to do these operations in SF8, because they take into account specific characteristics of the user's scanner model.

- SilverFast's built-in Color Management; SilverFast scanner profiles are customized to the scanner model; SilverFast automatically selects the correct scanner profile for the chosen media to be scanned, and SF8 **Ai Studio** has a function (**Auto IT8 Calibration**) that I recommend for automatic profiling of your own scanner (Chapter Three);
- **NegaFix**: when scanning negatives, use SF8's **NegaFix** module to select the appropriate **NegaFix** profile for your film, which LaserSoft Imaging has optimized for the scanner in use (Chapter Nine);

(iii) Operations independent of the hardware ("software functions")

These operations are found in many post-scan image editing applications. They can be done either at the scan or post-scan stage almost interchangeably. I say "almost" because there are some caveats that could have an impact on image quality, depending on where they are done. I list the operations and mention the caveats.

- **Gradation** Curves (also known as "Tone Curves" or simply "Curves")
- **Histogram** (including setting the Black and White points)
- **Neutral Pipette** (gray balancing or "white" balance) best done in SilverFast
- **Global Color Correction** (removing or balancing between colour casts)
- **Selective Color Correction** (adjusting individual colour ranges)
- **Descreening**, best done in SilverFast
- **Sharpening** and **Grain mitigation**

The caveats are as follows, and point to a general recommendation that it can be worthwhile working at least the first six on the above list in SF8. Sharpening and grain mitigation are special cases deserving careful forethought. Please see Chapters Six and Ten.

(a) SF8 works under the hood to perform the above-listed adjustments in a manner that preserves image quality very well, (unless the user makes major errors using these tools). **Only if you need to know more why this is the case:**

All image editing consists of mathematical operations on pixel data, which destroy varying amounts of information (depending on the operation) and introduce "quantization errors" due to limits of the image's "bit depth" and "dynamic range" [5]. These errors can be minimized if the software performs all the calculations at one "go", rather than sequentially, and if the images are processed in 48-bit rather than 24-bit depth. SF8 and SilverFast HDR do this at the scan stage. Quantization error would be hardly noticeable in 24-bit or 48-bit scanned images that have been optimized in 48-bit mode in SF8 before scanning. I generally recommend scanning in 48-bit mode; people scanning to 24-bit output (say, for the JPEG format) may find that their images have smoother tonal gradation if they were to make these adjustments at the scan stage in SilverFast, where all the edits are calculated in 48-bit mode before being scanned to 24-bit output.

(b) I often observe in practice that the closer the scan is to the intended result, the less and the easier is the finishing needed in an external editor, and the more latitude is retained for post-scan edits. A clear case in point, which I see over and over again, is that gray-balancing the image with the **Neutral Pipette** in SilverFast produces a degree of overall colour balance correction that is much more difficult to achieve in Photoshop alone. Unique to **SF8 Ai Studio** is the ability to set four such points and achieve a white balance across different areas of the image. This is particularly useful when you find that no one point is completely correct, but determining several neutral points delivers a better result for the image as a whole.

(c) It is essential to make sure at the scan stage that wanted highlight and shadow tones (and associated image detail) are not "clipped" (deleted) before scanning due to inappropriate settings of the histogram black and white points, curves or exposure controls. Once those tone levels and details are lost, they are gone forever unless the image is rescanned with the tails of histogram preserved. I discuss control of the image tonal range in Chapter Seven.

(d) SF8's **Selective Colour Correction** (**SCC**) tool has unique features not found in other pixel-based editing software – including the ability to adjust up to twelve separate colour groups, layer masking within the tool itself, and targeted adjustment capability (by clicking in the image area, the appropriate colour group is

[5] I describe these concepts in chapters Four and Five.

automatically selected for correction). Lightroom also has a targeted adjustment capability, but with a different masking concept than that found in SF8, as Lightroom is not a layer-based application. Photoshop, of course, has highly developed layering and masking capabilities, but its Selective Color Adjustment Layer does not have a targeted adjustment tool, and it cannot work on as many as twelve colour groups.

(e) **Descreening** mitigates the appearance of print screens in published media such as magazines and newspapers. It can interfere with good visual quality of text and images. There are no descreening algorithms in Lightroom or Photoshop. SilverFast is the only application with a special text enhancement function in its descreening tool, which can very much help to improve the quality of any optical character recognition (OCR) done to scanned reflective media.

(iv) Image Format Specification (The Intended Output)

This is a series of workflow steps that must be done up-front in preparing the scan. The format specifications include the following items:

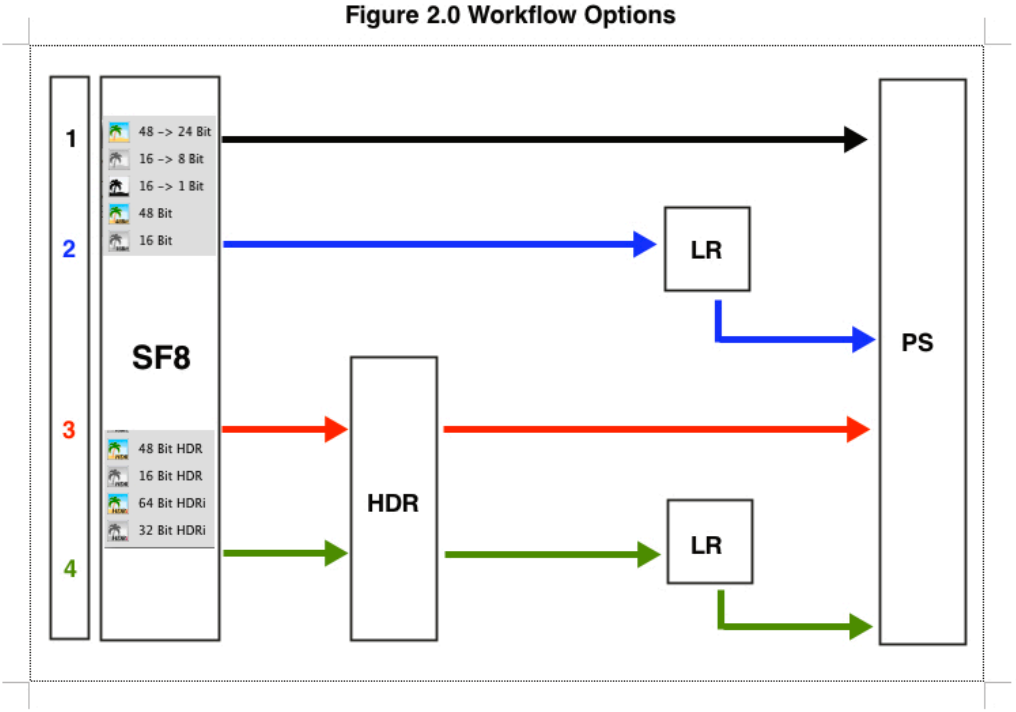
- The source media - whether positive transparency (such as Kodachrome, Ektachrome, Agfachrome or other) or negative transparency (Kodacolor, Agfacolor or other), or paper photographic print or printed page.
- The scan output: print or web and devices
- Bit Depth
- Crop
- Image Dimensions
- Resolution
- The file format of the scan (e.g. TIFF, PSD, JPEG, JPEG2000).

I explain these settings in Chapters Four and Five.

2.3 Workflow Structures

Figure 2.0 demonstrates the basic workflow paths within which the above-mentioned functions are implemented., the left side of the diagram pertaining to the scanner, and the right side to the external applications (that I focus on) in which scans can be opened.

Figure 2.0 Workflow Options



Legend:

SF8	SilverFast 8
HDR	SilverFast HDR
LR	Adobe Photoshop Lightroom
PS	Adobe Photoshop, or Elements
The grey menu options	Scan Color Modes and Bit Depth

The schematic of Figure 2.0 shows the main options for integrating SF8 with other applications.:

- **Workflow 1** goes directly from SF8 to Photoshop.
- **Workflow 2** does the same, but via Lightroom.
- **Workflow 3** gets to Photoshop after using SilverFast HDR.
- **Workflow 4** does the same as Workflow 3, but through Lightroom.

Within the SF8 column in Figure 2.0, I show the **Scan Color Modes and Bit Depths** (the boxes with gray background) available to the four workflow schemes. The modes available in Workflows 1 and 2 do not provide for an HDR workflow. The modes available in Workflows 3 and 4 are for scanning to HDR.

Not shown in Figure 2.0, increasingly, photographers find Photoshop unnecessary once they finish editing their images in Lightroom; also not in Figure 2.0, some

SilverFast customers prefer a "SilverFast only" approach. This is, after all, a richly featured application in which one can do a very wide range of image edits without reference to an external editor.

You would chose to work with one or the other of these workflows depending on which tools you prefer to use for editing your images. However, I begin the discussion of workflow structuring by looking at the SilverFast family alone (SF8 and SilverFast HDR). I then consider the options shown in Figure 2.0.

2.4 Setting-up Workflow Application Alternatives

To remind, the main purpose of this chapter is to provide basic instructions about how to set-up alternative workflow sequences using SF8 alone, SF8 complemented by SilverFast HDR and SF8 complemented by Photoshop and/or by Lightroom (both with or without using HDR).

In Chapter Ten I walk through image editing operations using these alternatives, because it is best to see this in more detail after developing a good understanding of the image editing controls within SF8, as described in chapters Three through Nine. All these options have colour management choices you will need to make, (unless you remain with the **WorkflowPilot**). I explain them as the last part of Chapter Three, dealing with colour management principles and policies.

Referring back to the **Grand Overview** at the start of this Chapter, you can chose where to make the **Category (iii) - Operations independent of the hardware ("software functions") -** image adjustments found in SF8, SilverFast HDR, Lightroom and Photoshop, pretty much to taste; however, apart from your taste in the matter, there are many image editing features available in Photoshop and to a lesser extent - Lightroom which do not exist in SF8 or in SilverFast HDR.

The **first decision to make** about how you will use SF8 for any of these modes is whether you want the application to guide you through the workflow in a structured way, or whether you will use the program without this structured guidance. You make this choice by clicking the most upper-left icon of the interface (the globe with the airplane – that is, the icon by the cyan or green arrows in the illustrations below). It is a switch toggling between the two working methods).

When you toggle the globe to **cyan** you are in the guided **WorkflowPilot** mode.

When you toggle to **red** you are in manual mode.

The Scan Dimensions panel in Manual mode provides more flexibility setting resolution and dimensions than available in the **WorkflowPilot** mode. Specific instructions for launching and operating the **WorkflowPilot** mode are given in the first section of Chapter Ten. In the following discussion I work from Manual mode. Most of the instructions are the same.

In all of the workflows of Figure 2.0, having chosen Manual mode in SF8, you then select the **scan properties** using the four buttons at the top of the Dock, shown immediately below (Figure 2.0.1 enclosed in the red box for illustration here).

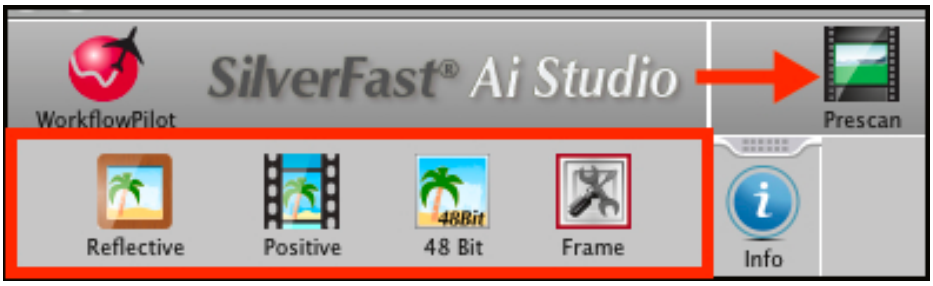


Figure 2.0.1 Scan Type Choices

Then you select the image you wish to scan (see Frames discussion in Chapter One) and click on **Prescan** (Figure 2.0.1, green/black icon by the red arrow). This will fill the preview window with the image.

The immediate following procedures first describe the set-up for using SilverFast alone, then continue with the four workflows of Figure 2.0

2.5 To Make all Adjustments within the SilverFast Family

You have two choices for making all the image adjustments within the SilverFast family: (i) use one of the SF8 versions on its own, or (ii) use SF8 combined with SilverFast HDR. Recall from Chapter One, the main purpose of using SilverFast HDR: SilverFast HDR saves "raw" scans in the non-edited, non-adjusted state, allowing indefinite, essentially non-destructive re-editing of the image using the same tools within SilverFast HDR, without the need to rescan the originals.

If you intend to print the image or do further work with it for Web and Devices, you would then export it to an external editor for those purposes.

To use SF8 alone, without HDR: Please see Figure 2.1 below and follow this **step-by-step** procedure.

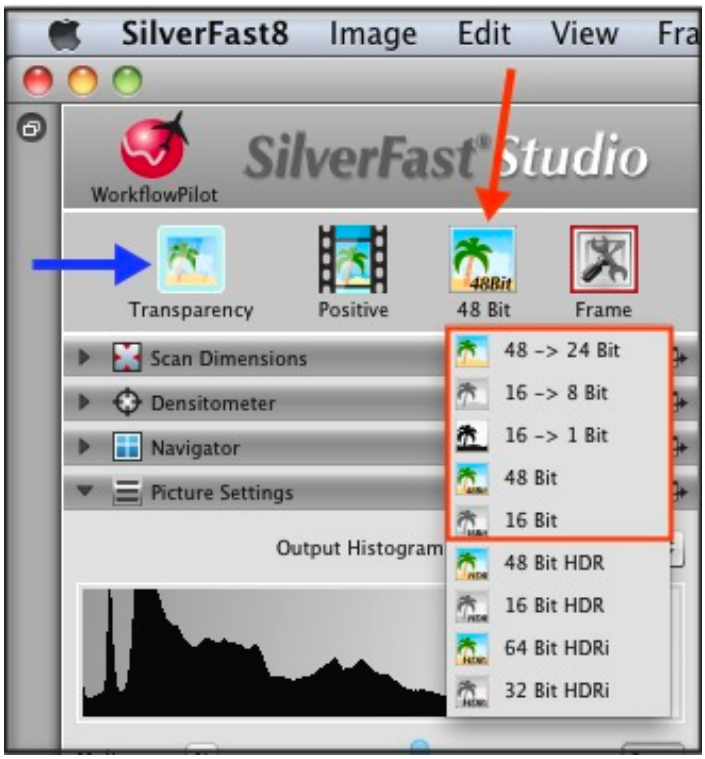


Figure 2.1 Scan Types SF8 Alone

1. If you use a flatbed scanner, click on the left-most icon in the scan-type bar (Figure 2.1, blue arrow); two options will open: **Transparency** (for scanning film), **Reflective** (for scanning paper originals); click on the one corresponding with the media you are scanning. For a dedicated film scanner, **Transparency** is selected by default because these scanners do not perform reflective scans.
2. For transparencies, then click on the next icon to the right. A menu opens giving you choices of **Positive, Kodachrome** (not in SF8 SE version) or **Negative**. Click on the one corresponding with the media you are scanning. It is important to distinguish between Kodachrome and other Positives (all non-Kodachrome transparencies), because Kodachrome has its own set of scanner profiles that SF8 **Ai Studio and SE+** will automatically select for more accurately rendering the colours of that film.
3. Then click on the third button from the left (Figure 2.1, red arrow); a drop-down menu appears. Select a **colour mode/bit depth** from one of the first five options (Figure 2.1, delineated by the red box). If you are unfamiliar with considerations of bit-depth, please refer to the discussion in Chapter Five. I recommend using the higher bit-depth for any scans to be printed.

The first and fourth choices from those highlighted in the red box of Figure 2.1 are for colour scans and the other three for grayscale (Black and White). The best quality colour scan for printing is a 48-bit scan, and the best quality for grayscale printing is 16-bit. 24-bit colour and 8-bit grayscale are suitable for images destined

to the Internet and for viewing on device displays. 1-bit is for Black and White line-art.

After selecting one of the five, proceed to **Prescan** (Figure 2.0.1 red arrow), then dimension and edit the image within SF8 (Chapter Three onward), and save it to a folder on your hard drive.

2.6 SF8 with SilverFast HDR (Figure 2.0, workflow paths 3 and 4 as far as "HDR")

I first recall two key advantages of scanning to SilverFast **HDR** or **HDRi**[6]. These are, firstly that it gives you an unedited scan containing all the data your scanner can reproduce, and secondly, you'll be able to edit and adjust the scan any time in the future without rescanning and with minimal loss to the integrity of the scan data. This is what LSI means by the term **Archive** in the naming of its **Archive Suite,** which includes both SF8 and SilverFast HDR.

An "unedited scan" means that when you select one of the HDR scan types (Figure 2.1 underneath the red box), all tonal and colour editing functions are inaccessible (such as Curves, Histogram, colour balancing, selective colour, grain mitigation, sharpening), except as described below. The editing functions not available in SF8 for these scans are instead performed in the sister-application - SilverFast HDR.

The term **HDR** in SilverFast has a different meaning from that in digital camera capture and image processing. For digital camera capture, the meaning of HDR photography is that the photographer has made several exposures of the scene at different exposure settings, each optimized for shadows, midtones and highlights, and then used software to blend the exposures into one photograph with optimal tonal range in all lightness zones.

Typically, in an HDR scanning workflow, we are digitizing one photograph that contains one exposure; hence, all the available luminosity information comes into the scanning process from that one original medium, whether transparent or reflective. **HDR** in this context means that the software captures all the luminosity information that the scanner can deliver from the original media in one scan (or two scan passes using **Multi-Exposure**), with no editing that can destroy data.

There are four exceptions to this absence of editing:

- Gamma (concept explained in Chapter Three);
- Multi-Exposure;
- Choice of HDR or HDRi and
- Colour Management Preferences.

---

[6] An HDRi scan is an HDR scan augmented with the infrared channel (supported scanners), used for identifying dust and scratches for removal.

Gamma: A Gamma value defines the contrast and brightness of mainly the image midtones. Lower values produce flatter, darker images and higher values produce images that are brighter, with more contrast.

If you are using HDR but **not** opening the scanned images in an external editor, you can ignore the remainder of this section and proceed directly to the next section on **Multi-Exposure**.

If you **are** planning to scan to HDR **and** then open the images in an external editor (Photoshop or Lightroom), go to **Preferences> General** (Figure 2.2), where I suggest several options depending on what you prefer to do:

Figure 2.2 Gamma Correction for HDR Output

1. If you wish to conserve an HDR scan file as close as possible to the information emerging from the scanner, **ignore the Gamma Gradation box** (Figure 2.2 red arrow bottom left), and **DO NOT** check the box that says **for HDR output** (Figure 2.2, red arrow bottom right)**.** When you open the HDR file in Lightroom or Photoshop it may look too dark, in which case you will correct this by shifting the midtone input slider in **Levels** (Photoshop) leftward or in **Brightness/Exposure** (Lightroom 3.5/4.0) rightward.

2. If you wish to conserve an HDR scan automatically retaining the appearance of what you see in the HDR Preview when you open it in Photoshop or Lightroom, leave the **Gamma Gradation** box at its default value of 2.2 and check the box that says **for HDR output**. I prefer this approach.

3. If you wish to Preview the HDR image in SilverFast seeing how it would look at Gamma values different from the default 2.2 (Figure 2.2, red arrow bottom left), adjust the Gamma value to the desired setting. You may find it

interesting to experiment with different values and see what Gamma does visually.

If you don't think you want to know any more about Gamma settings in SilverFast, you may skip the remainder of this section and proceed directly to the **Multi-Exposure** section below. However, **only if you want to know more about Gamma settings for SilverFast HDR……..**

You may alter the **Gamma** setting in the **Preferences>General** panel. You do so by entering a **Gamma Gradation** value[7] (e.g. 2.2) and you may check the box beside it: **for HDR Output**. Let us explore the "ins" and "outs".

The scanner CCD sensor produces a "linear response" right across the tonal range – that is, the brightness coming into the sensor is identical to the brightness it records and outputs. Hence, the default scan is "linear" – that is, it has a Gamma value of 1.0. This normally produces an image that looks rather dull and low contrast to the human eye (Figure 2.3, right-most image).

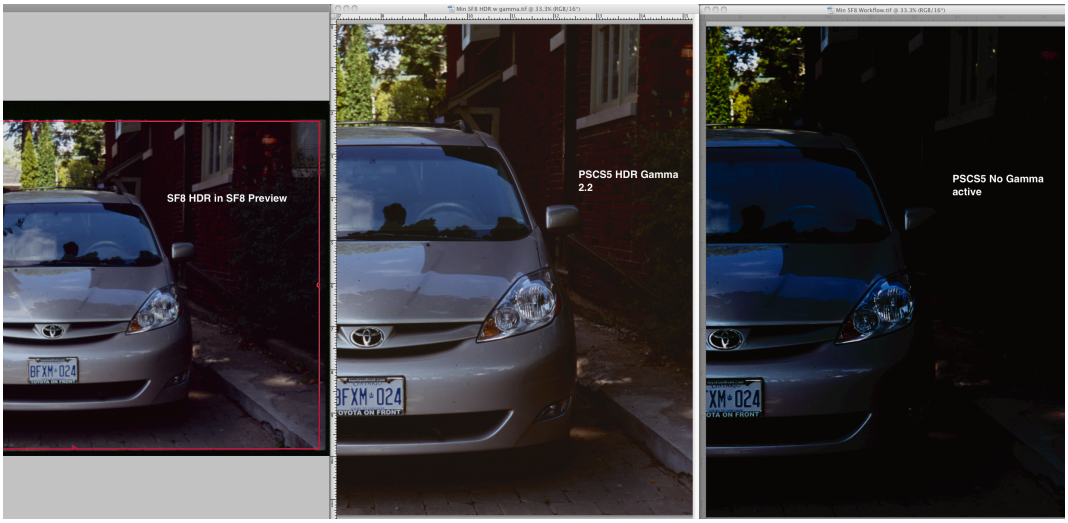


Figure 2.3. Gamma 2.2(left) vs. Gamma 1.0 (right) for HDR Scan

Setting Gamma to a value greater than 1.0 - for example, the usual standard of 2.2 - gives the HDR preview, a brightened and more contrasted appearance (Figure 2.3 left) than if Gamma were set to 1.0; most people would consider the Gamma 2.2 appearance to look more "normal".

However, the HDR image file itself retains the pixel values resulting from using Gamma 1.0, unless the **for HDR output** box is checked, in which case SF8 does process the selected Gamma value (greater than 1.0) into the HDR scan file. It can

[7] In Chapter Three there is a more detailed description of Gamma and Gamma settings in the explanation of Gamma Gradation under General Preferences.

make sense to do this if you intend to open the file for editing in Photoshop, because Photoshop will only recognize the pixel values embedded in the scan file. If those values were based on Gamma 1.0, once in Photoshop, you would need to implement, say, a Levels Adjustment Layer midtone input slider shift to the left in order to achieve a brightness and contrast appearance that looks normal to you. This of course is possible, because all the image data is present, waiting to be revealed by exposure adjustments.

I demonstrate the difference that this one setting can make in Figure 2.3, where the left panel shows what the image looks like in the SF8 preview before scanning when Gamma is set to 2.2.

The next two panels to the right shows what the scans look like after having been scanned to SilverFast HDR and from there opened in Photoshop with no adjustments. The center panel shows the result of having selected Gamma 2.2 for HDR scans in SF8 **Preferences>General with the <for HDR output> box checked**, while in the far right panel, the **for HDR output** box is not checked, hence the Gamma value of the scan is 1.0 and the scan looks dull and dark.

Despite this, all of the tone and colour data is in the scan and can be opened-up in SilverFast HDR or in external editors. However, I recommend that for using an HDR scan in Lightroom or Photoshop in general you should select a Gamma in the range of 2.0~2.2. More often than not, it yields results that are safer to work with in the post-scan workflow. That said, if you prefer to retain a scan whose luminosity (brightness and contrast) remains completely unaltered – as if in a "raw" state directly from the scanner, leave **for HDR output** unchecked.

Multi-Exposure (ME): Secondly, you may decide whether or not to enable **ME**. **ME** makes a second exposure in the scanner to help improve tonal separation in the shadow and dark tones for scans from positives, or in the highlight tones for scans from negatives. I recommend using it. Turn on **ME** by clicking on the **ME** icon in the SF8 tool column (Figure 2.4). It is active when it looks "turned on". It toggles on and off.

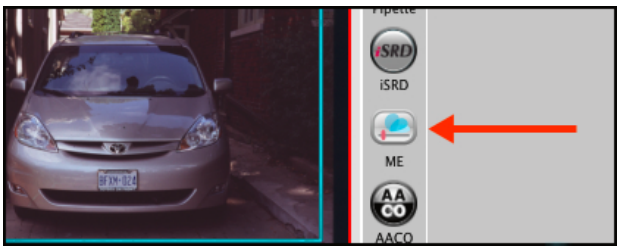


Figure 2.4 Multi-Exposure Control Toggles On or Off

HDR or HDRi: Thirdly, you may chose between an **HDR** or an **HDRi** scan type. The difference is that the **HDRi** scan conveys the infrared channel with the RGB channels, while the **HDR** scan does not. SilverFast's **iSRD** tool (Chapter Six) uses the

infrared channel (in scanners supporting an infrared channel) to identify dust and scratches for removal in SilverFast HDR. The advantage of the **HDRi** scan type is that, when using SilverFast HDR, you can amend post-scan dust and scratch treatment (with the SilverFast **iSRD** tool) using the information from the infrared channel without rescanning. Infrared data is not available to external editors such as Photoshop or Lightroom, so it must be used at the scan or HDR processing stages.

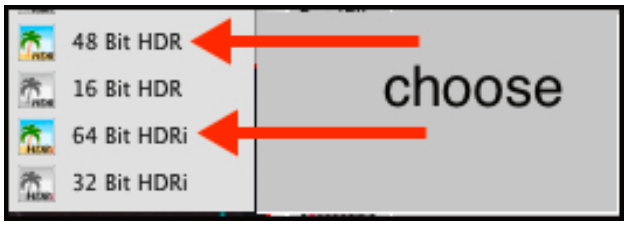


Figure 2.5 Select HDR or HDRi

Scanner Colour Management: SF8 automatically selects the scanner (**input**) profile for the scanner and media you are using. You may decide whether or not to embed the scanner profile (in **Preferences>CMS**[8]). You essentially have two choices here: either to do this at the scan stage in SF8, or to do it within SilverFast HDR. I recommend embedding the scanner profile at the SF8 scan stage (by checking the box **Embed ICC Profile** in **Preferences>CMS**), as this procedure is less prone to the introduction of user-error in the post-scan workflow. I discuss this further in Chapter Three under Colour Management, save to say here that with the scanner profile embedded, the post-scan editing processes will take account of how the scanner renders colours.

We've now reached the stage where you've made your decisions about Gamma, Multi-Exposure, HDR versus HDRi and where to embed the scanner profile, and of course you have set the scan dimensions, resolution and recipient folder, all in SF8. Then you click the **Scan** icon. This will save the image to the folder in which you chose to save it. It is now ready to be opened in SilverFast HDR for further editing, without any rescanning – as often as you wish. I elaborate further here about the advantages of the HDR workflow.

For mathematical reasons, some information loss occurs every time one edits an image file, and this happens in any image-editing application, the extent of it depending on the application's processing algorithms. Some "levels" of luminosity are eliminated. If you re-edit the image in SilverFast HDR following the procedure recommended here, this loss will be small and undetected for two key reasons: (i) the vast amount of image data one starts with in a 48-bit scan – each pixel is capable of rendering one of 65,536 possible levels of luminance in each colour channel, and

[8] Scanner profiles and colour spaces are explained in Chapter Three, which I suggest you consult if you are unfamiliar with the roles and management of profiles and colour spaces.

(ii) when re-editing an image in SilverFast HDR, one starts from the original archived scan, therefore not piling edits on top of edits.

The image editing procedures and tools using SilverFast HDR are very much the same as those when using SF8 for the same purposes, except that no scanner is involved and no matter what adjustments you make to the HDR image, you can always revert to the original saved scan in HDR and change the settings.

When you have done whatever editing you wish to do in SilverFast HDR, you click **Process** (Figure 2.8)**;** you will be asked where to save the file. Give the file another name and select a folder where you want it stored. This new file retains the edits made in SilverFast HDR, while the original HDR file that you started with remains in its original location unedited.

This is similar to a workflow wherein you would maintain an original unedited scan on your hard-drive, then in Photoshop or Lightroom only make edits which are completely reversible. This is default behaviour in Lightroom, but not necessarily in Photoshop, where care would be needed to use Layers and Adjustment Layers for all editing, so that you can reverse them or change them later.

Here is the **step-by-step** to scan an image in SF 8 for processing it in SilverFast HDR or HDRi.

1. In SF8 select the appropriate **scan type/bit-depth** from one of the four options **below** the red box in the drop-down menu (Figure 2.1; Figure 2.5); this will disable your ability to do any colour or luminosity editing in SF8 except as described above; recall, the purpose is to create an unaltered "master-file" of scanned data.
2. In SF8 **Preferences>General**, you may increase the Gamma above 1.0 by typing in a value and checking the box **for HDR Output**.
3. In SF8, you may activate **Multi-Exposure** by clicking on the **ME** button in the tool column (Figure 2.4).
4. You may embed a scanner profile in **SF8>Preferences>CMS** (further discussion in Chapter Three).
5. After setting-up the image dimensions and resolution in SF8 as described in Chapters Four and Five, click the **Scan** icon, saving the image to a bespoke folder on your hard-drive, then start SilverFast HDR (Figure 2.6 red arrow).

SilverFast 8
Welcome to SilverFast 8
WorkflowPilot-concept
SilverFast Features
SilverFast - Pioneer in Digital Imaging
SilverFast®8
64 Bit HDR
PLAY MOVIE
LSI
LaserSoft Imaging
©2011 LaserSoft Imaging AG, LaserSoft Imaging, SilverFast, SilverFast HDR, SilverFast Multi-Exposure, ACR, GANE, HiRePP, NegaFix, ScanPilot, SRD, iSRD, SCC, SC2G, PrinTao are registered trademarks of LaserSoft Imaging AG, Germany. All mentioned trademarks are the protected trademarks of the respective owners.
Patents: EP 1594301, EP 1744278
Language selection
US/English
Service Dialog
Start

Figure 2.6 Open SilverFast HDR

6. Open the image by clicking on the **Open** icon (the first one in the **Standard tools** toolbar, Figure 2.7, red arrow).

Figure 2.7 Open Image in SilverFast HDR

7. Your image appears in the SilverFast HDR application Preview window. Make the adjustments you wish to make[9]. Then, I recommend you click on the **Info** button in the **Tool column** (Figure 2.8 blue arrow) and save the information about the settings you just made.

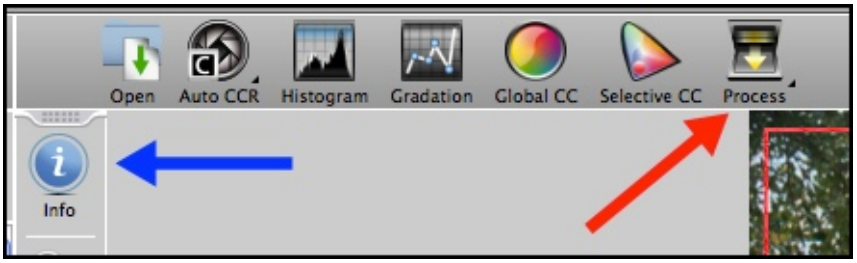


Figure 2.8 SilverFast HDR Process Command

[9] The layout of the SilverFast HDR application is almost the same as that of SF8 **Ai Studio**.

8. Give the image a new name and select a folder on your hard-drive in which you wish to save it (image Dimension Panel). Then click **Process** (Figure 2.8, red arrow).

If you wish to re-edit this image later, open **the original unedited HDR scan** into SilverFast HDR (Figure 2.7) and proceed to make a fresh set of edits. Then repeat Steps 7 and 8 to create a new file.

2.7 Workflows (1) or (3) – SF8 to Photoshop, or to HDR then Photoshop step-by-step:

Steps 1 to 6 below **take you directly from SF8 to Photoshop** (Figure 2.0, Workflow **#1**); **step 7** moves the process to SilverFast HDR, then to Photoshop (Figure 2.0, Workflow **#3**).

1. Select one of the non-HDR scan types – say 48-bit colour.
2. Perform any editing you wish to do within SF8.
3. Click the **Scan** icon.
4. The image is saved to a pre-selected folder on your hard-drive.
5. In the **Scan panel** (bottom of SF8 Dock), there is a little icon that looks like a file (Figure 2.9 red arrow). Click it to open the image into Photoshop.
6. The image opens in Photoshop if in your operating system you have associated the scanned file format (e.g. TIFF) with Photoshop to be its host application. Then, do in Photoshop whatever edits you didn't do in SF8.

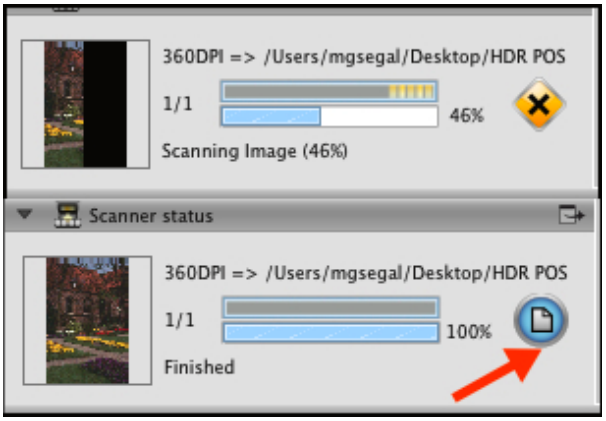


Figure 2.9 Open scan into Photoshop

7. **If you are working from SF8 to SilverFast HDR, then to Photoshop** (Figure 2.0 Workflow **3**), you would have implemented the workflow from SF8 to SilverFast HDR described in the **step-by-step** above. After you click "**Process**" in SilverFast HDR, when the processing is finished you will have access to the same icon as in Figure 2.9 above the red arrow; click on that icon to open the image in Photoshop. This will open the HDR scan in Photoshop provided Photoshop is the application designated (in your

computer operating system) to open files of a type you selected (e.g. TIFF, PSD, JPEG).

For those of you who don't use Photoshop, but do use the much less expensive **Adobe Photoshop Elements**, the good news, of course, is that you can open your scanned images into **Elements** for further adjustments, or simply to print them or share them on the Internet.

2.8 SF8 Followed by Lightroom Version 3.x or 4.0 (Figure 2.0, Workflow 2)

In the work I've done with both applications, I see benefit from using the best of what each application offers. Lightroom provides editing features either not found in SilverFast, or implemented differently. The key ones are:

- Permanent history track allowing step-by-step reversal and amendment of previous adjustments;
- Adjustment Brush and Gradient for local tonal editing;
- Perspective control;
- Recovery, Fill, Blacks (LR 3.5), Exposure, Shadow, Highlights, Blacks, Whites, (LR 4.0), Vibrance and Clarity, for highly refined local tone, saturation and contrast adjustments;
- Attractive variants on grayscale conversions;
- Noise reduction and sharpening algorithms;
- In Lightroom 4, you can directly prepare Books with many layout variants and text directly from scanned images, using the new Book module.

Both programs offer grain reduction and sharpening, exposure adjustment, a tone curve and Hue/Saturation/Luminance adjustment tools, while SF8 offers unique scanner-related adjustments discussed above, which make sense implementing before sending the image to Lightroom.

I recall that Lightroom can work with a very large number of raw file formats as well as with the rendered PSD, TIFF and JPEG file formats. Unlike raw files from digital cameras, scans from any scanning application are rendered, three channel, pixel-based images, whether encased in a DNG container or not, but Lightroom can edit them if they are in TIFF, PSD or JPEG format.

It would be really convenient if SF8 were available as a seamless plug-in or module for Lightroom. That not being the case, I recommend two workarounds [Methods **(A)** or **(B)**] for "knitting" the work between the two. Here is the **step-by-step**.

(A) Scan the media to a folder on the hard-drive, note the name of the folder, then open Lightroom and migrate to **File>Import Photos…..**, and select the noted folder. This is the simplest, manual approach.

(B) There is, however, a slicker, more automated approach, which essentially treats a scanner like a tethered camera and automatically opens the images as they emerge from SF8 into a Lightroom folder set-up. Setting this up takes a few steps, but it only needs to be done once and thereafter works seamlessly. I explain how to implement this linkage here **step-by-step**.

In your computer:

1. Create a folder in your hard-drive called for example **Scan Watch**.

2. Create another folder in your hard-drive called for example **SilverFast Output**.

3. Within the **SilverFast Output** folder, create a sub-folder with a name relevant to the series of images you are scanning into that sub-folder.

In Lightroom:

3. In the Library module, go to **File>Auto Import** (Figure 2.10) and configure as follows: click on **Auto Import Settings…** The dialog opens. (Unless you have done this before, the **Enable Auto Import** option just above **Auto Import Settings…** will be unavailable. This is not a problem. Once you've configured the Auto Import Settings, the option becomes available.) Click on **Enable Auto Import** (Figure 2.11).

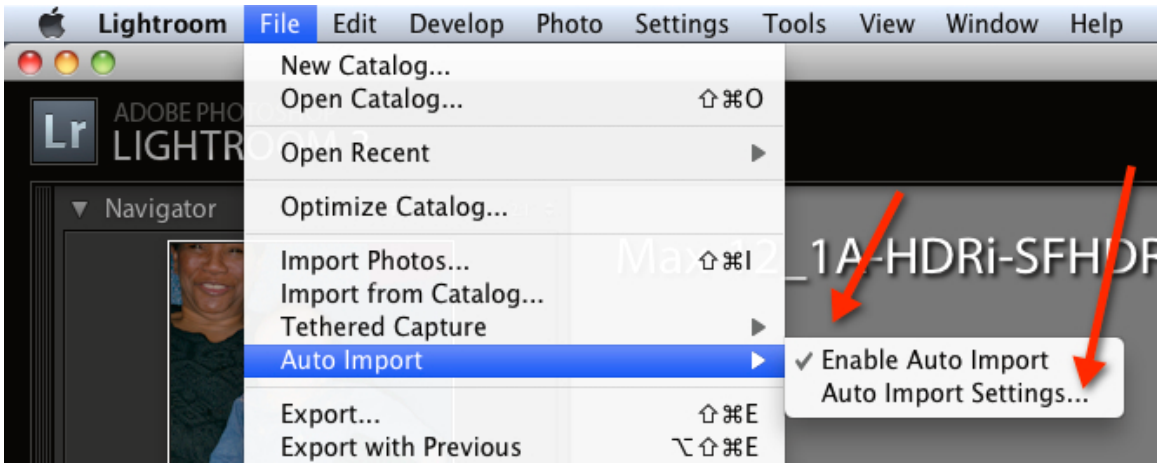


Figure 2.10 Auto Import Settings in Lightroom 3.x

(a) For **Watched Folder**(Figure 2.11, second row) click Choose, browse to the hard drive folder **Scan Watch**, select it and click OK.

(b) For **Destination** (Figure 2.11 third row) click Choose and browse to **SilverFast Output**, select it and click OK.

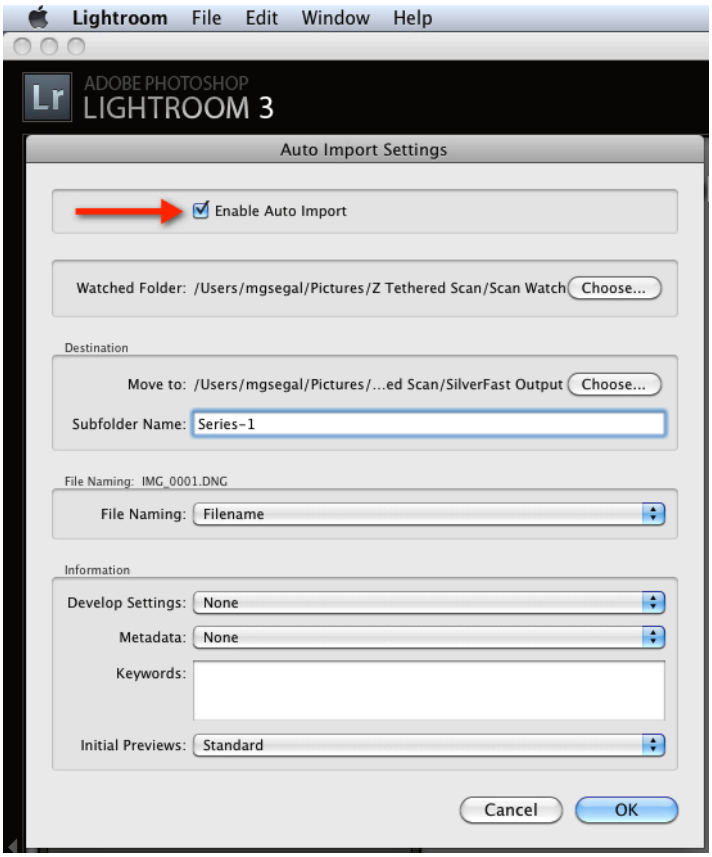


Figure 2.11 Lightroom Import Settings Concluded

(c) In the Sub-folder pane, enter the exact name you gave to the subfolder created in the **In Your Computer** section Step 3 above.

(d) For **File Name** (figure 2.11 fourth row) I recommend that you keep **Filename**. This will convey the same filename you gave the scan in SilverFast all the way through the process.

(e) For **Information**, add any other information of the type offered which you want saved with the image file.

(f) Check the box on top **Enable Auto Import** (Figure 2.11 red arrow).

(g) Click OK to accept the whole configuration.

4. In the **Library** Tab, left side, make sure the Catalog folder **Previous** Import is selected. ***Leave Lightroom OPEN*.**

In SF8:

5. In the **Scan Dimensions** panel, give the image you are about to scan a file name (this name will be carried through the process) and in the **Path** dialog click on the blue folder icon and migrate to your **Scan Watch** folder (Figure 2.12, red arrows).

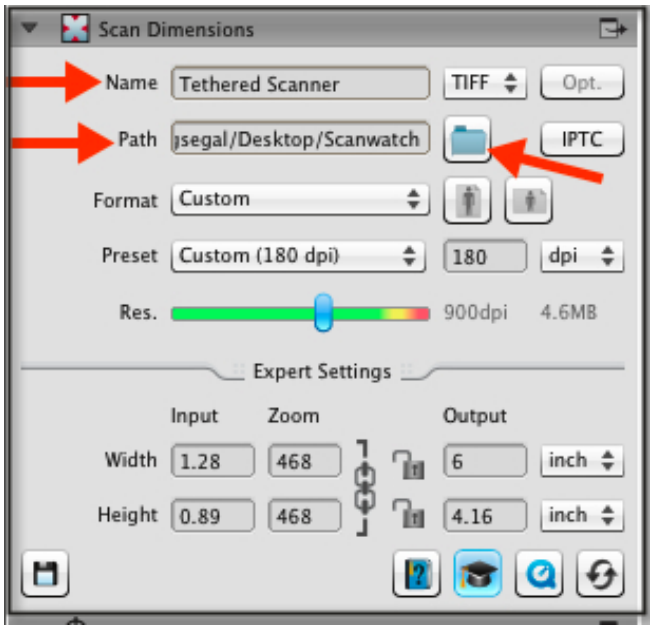


Figure 2.12 Save scan to Watched Folder

6. After you've done any editing you want to do in SF8, click the **Scan** icon.

The image will scan and after a few moments it will open in Lightroom's **Previous Import** folder, with a thumbnail in the large preview area. I recommend slotting the image to a bespoke **Collection** (Lightroom **Library** Module), then doing whatever further editing you require in Lightroom. When done, if the next stage is another application, such as Photoshop, **Export** the image to whatever other place in your hard-drive where you want this file to be stored.

Figure 2.13 shows how the image scanned in SilverFast opens in Lightroom, and the very close match of tone and colour between the two versions. A hallmark feature of SilverFast is the consistency of its colour management with Photoshop and Lightroom when using the Adobe Color Engine in the latter applications. This means, for example, that given a correct colour management set-up, the image preview you see in SilverFast as you make adjustments will be a good predictor of image appearance when you open the same photo in Photoshop or Lightroom.

2.9 SF8 to SilverFast HDR to Lightroom (Figure 2.0, Workflow 4)

Have Lightroom open. All of the foregoing set-up instructions to link SF8 with Lightroom apply, except for step 5 – do not send the scanned file from SF8 to **Scan Watch**. You'll save it elsewhere. Implement **the SF8 to SilverFast HDR step-by-step** above until you get to step 8, and at Step 8, after doing whatever editing you

wish to do in SilverFast HDR. save the HDR-processed image to **Scanwatch.** You should find the image in the **Previous Import** window of Lightroom, and you may now complete your editing in Lightroom.

In particular, please note: if you send a scan of a negative made with one of the HDR modes directly from SF8 to Lightroom, it will open in Lightroom as a negative.

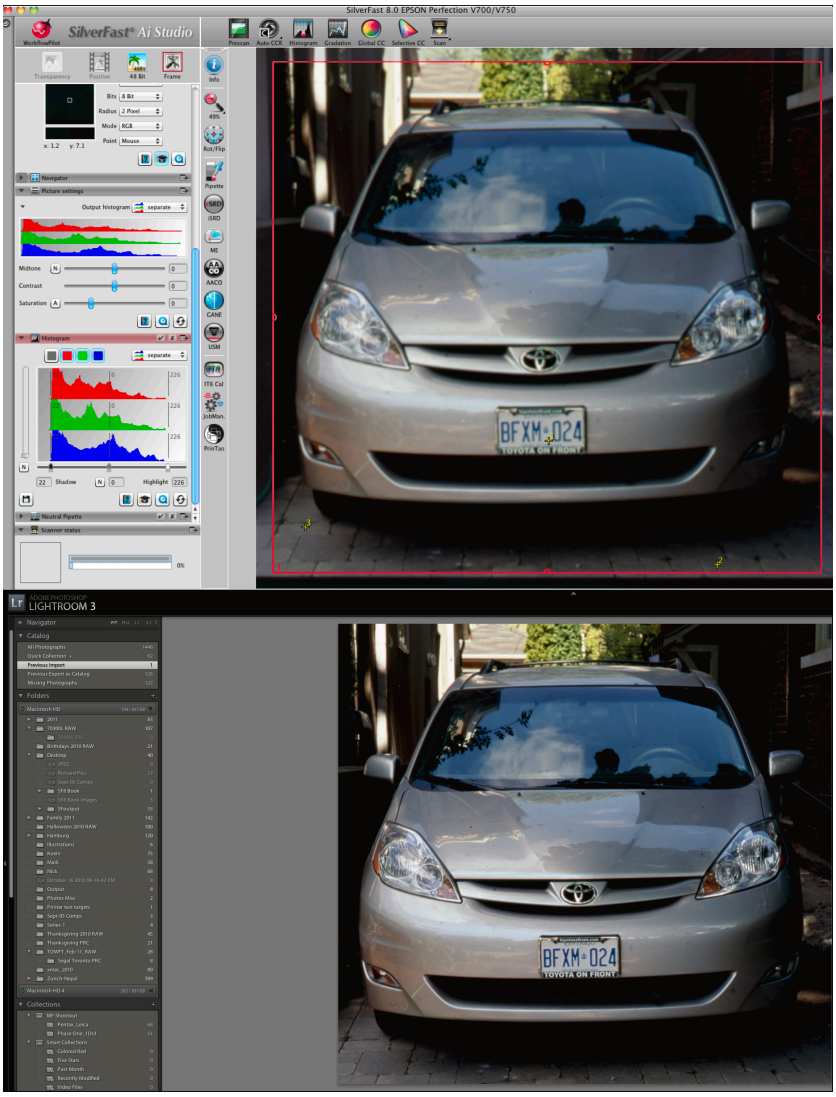


Figure 2.13 SF8 Scan Opened in Lightroom

2.10 The Checklist

The final workflow enhancement I present in this chapter is the **Checklist**.

This is an enhanced feature in SF8, which brings within easy reach a data record showing your image settings and adjustments. How often has it happened that you scanned an image, thought it looked OK at the time, but came back to it, decided it was wanting in certain ways, and wished you had a record of how you scanned it?

Or how often have you pushed the scan button without realizing that a feature or setting was incorrect? Well, SF8 now provides an easily accessible settings record you may consult before you push the scan button and after you save the scan. This could be an analytic assist and a time-saver.

And icing on the cake – if you had made this an HDR scan and edited the image in SilverFast HDR, there would be no need to rescan the image for making many of these changes.

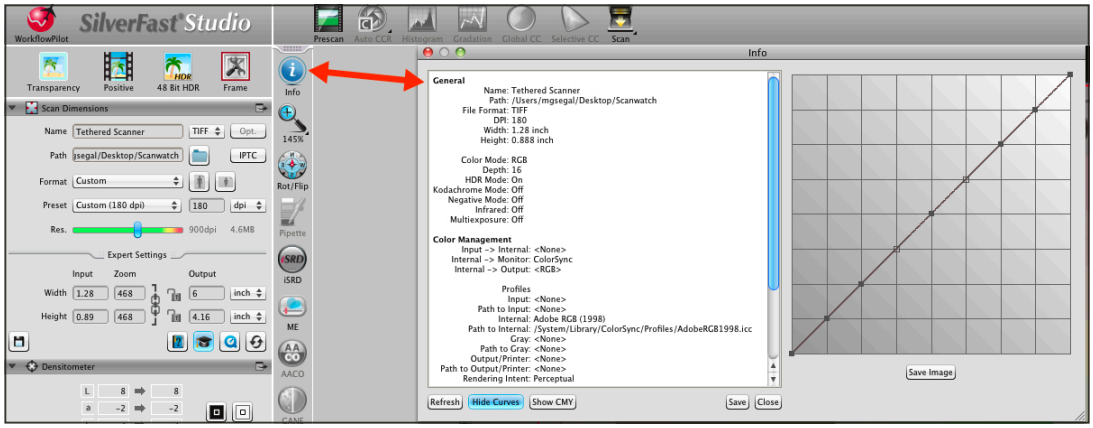


Figure 2.14 Image Checklist

To access the Checklist, you click the blue/white "info" button (Figure 2.14 red arrow), and it will open a window showing the settings for the image at hand. Items are added to the list as you select the tools in the course of preparing your scan. It can also show your tone curve in either RGB or CMY format by clicking on the Show Curve button in the dialog, and it allows you to save both the text and tone curve image to a file on your hard drive. You do this by clicking on "Save" under the text and "Save Image" under the tone curve. You don't need to do the latter if you've done the former, because the "Save" command under the text saves both the text and curve as a PDF document into the folder you specify on your hard drive. You should name the file with the image name and perhaps in the same or proximate folder, so that you will always know to what photo the information file refers.

I've covered how to handle the SF8 and SilverFast HDR interfaces and how to structure the key workflow alternatives that may be of interest to you. But I have one more group of "set-up tasks" to handle before I get to the core business of scanning proper – that is: application preferences and colour management (a system function completely distinct from colour correction of individual images!).

Chapter Three
Application Preferences and Colour Management

3.1 Application Preferences

These are the choices guiding how certain tools work and how SF8 scans the media. Before you even load an image, set the preferences to reflect the application's operating conditions you need. In Mac OSX you access the Preferences from **SilverFast8>Preferences** (Figure 3.1). In Windows, you access Preferences from **Edit>Preferences**, where Preferences is the final option before "Quit".

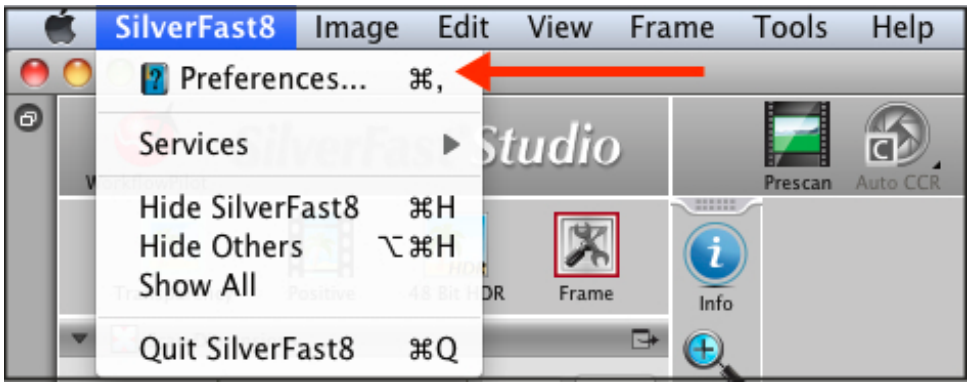


Figure 3.1 Access to Application Preferences (Mac OSX)

In SF8, there are five menus of preferences: **General, Auto, CMS** (Colour Management System)**, Special** and **WorkflowPilot** (Figure 3.2).

Figure 3.2 Preferences Interface, General Menu – film scanners

I explain the available settings for all but **CMS** just below. I explain the **CMS** preferences in the context of the colour management discussion that follows later in this chapter.

I discuss preferences at this point in the book, because unless you are using a totally automated workflow with all preferences left at their default values, it is necessary to set preferences before scanning. That said, concepts arise here with which you may not be fully familiar. Therefore, where relevant, I point to other chapters in the book covering the basics of these concepts, so that you can refer to them and better understand how to set some of the preferences.

General Menu

Color Model:

There are two choices: **RGB** and **CMY** for ("Red, Green, Blue" and "Cyan, Magenta, Yellow" respectively). Unless you are preparing images for a printing press, you would select RGB. RGB is the color model used for monitors, device displays and inkjet printers. While inkjet printers use CMYK inks, for most inkjet printers, the printer firmware expects to receive image files in RGB, which it then prints in CMYK. If you give an inkjet printer CMYK files, it will convert them to RGB and then reprocess that data for CMYK inks. This is not recommended. If you are using a RIP (Raster Image Processor) to control your printer and you are scanning straight into a print output ONLY, the CMY colour model may be more appropriate.

Units of Measure:

The choices are inches, centimeters, Pica, Point and Pixels. These units of measure are for dimensioning the scan output. If you are scanning only for the Internet and device viewers, it makes sense to use the Pixel scale, because the requirements for image dimensions are usually stated in pixels for these media. Points and pica are useful for dimensioning images being integrated with pages of text. Otherwise, for inkjet printing one would use inches or centimeters.

Now, interestingly enough, due to a long-standing convention in the scanning industry, the resolution metric (in the **Scan Dimensions** panel) is stated alternatively in **ppi** or **dpi** (which later means "dots per inch", a conventional but erroneous descriptor for what is really "samples per inch" which turn into "pixels per inch" - **ppi**). Scanners don't make dots. They scan samples that become pixels. Hint: whenever you see **dpi** in a scanning context, mentally convert it "on the fly" to **ppi,** because it is **ppi** that you will be using for setting scan resolution.

Densitometer Radius:

The **Densitometer** is the tool in SF8 enabling you to sample a very small point or set of points and measure their colour and tone value. I discuss the use of the densitometer later in this chapter and then again in chapters Seven and Eight. Suffice to say for now that the choice in Preference is to have it sample and measure a radius of 1, 2, 3, 4 or 5 pixels in a sample reading. If you need per pixel

measurement accuracy, select 1 pixel. The other choices do an averaging of the values of the sampled pixel and the stated number around it, in order to minimize the risk of picking an outlier, which would provide a misleading measurement relative to the intention of the sampling. I usually set this value at 2 or 3 pixels.

Default Setting:

The only option is **Factory Default** unless you have saved your own settings in the application's scan set-up (discussed below) as a new custom default. If you have done so, this option allows you to define which group of settings should always open as your **default** settings. You access and select it by clicking on the drop-down pane for this preference and clicking on the saved default.

High Resolution Prescan:

For flatbed scanners, e.g. the Epson 700/V750, there is an additional item, not found in the film scanner **General Preferences**, called **High Resolution Prescan** (Figure 3.2a, red arrow).

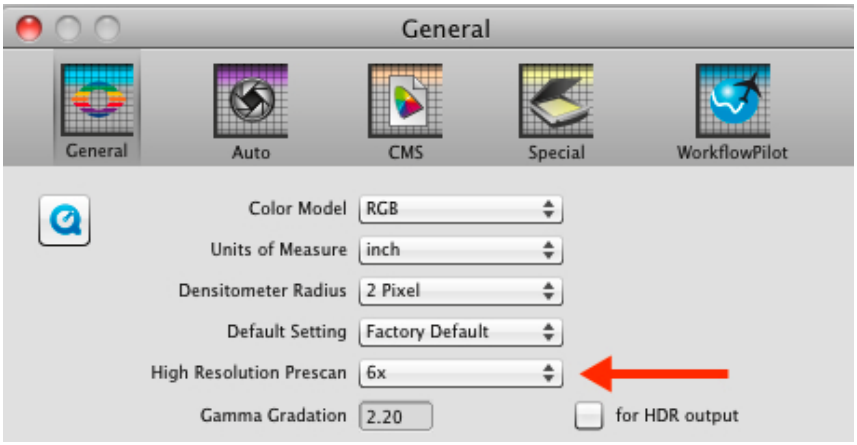


Figure 3.2a General Preferences, flatbed scanner

Clicking on the drop-down menu, you may select from 1x to 8x prescan resolution, 1x being no change in the resolution of the prescan. Using higher values will immediately give you a sharper magnification of the original media when it is selected and magnified to fill the Preview space (using the magnifier tool, shown in Figure 1.6, second item in the tool column). The extent of magnification needed depends on the size of the preview area into which you will be fitting the image (it is scalable by dragging the right corner of the interface.) You get some help selecting the correct value by observing the colour of the magnifier icon when you click on it to fill the preview area with the image. If the icon turns red it means that you may achieve a sharper preview using a higher resolution setting in the **High Resolution Prescan** menu, or prescanning again at the current zoom. If the magnifier is green, the prescan resolution is satisfactory for delivering a sharp prescan filling the window.

Gamma Gradation:

Gamma is a technical metric defining the manner in which image brightness and contrast is developed.

For most purposes, most users would leave this set at the default value of 2.2.
However, if you really want to know more about Gamma, read on.

The discussion of Gamma is about how "Input" brightness values are remapped to "Output" brightness values. "Input" values are those generated in the scanner by photons hitting the CCD, before making any changes to image tonality. "Output" values are the result of remapping the Input values by applying a Gamma value to them.

Left alone, imaging sensors have linear response: their output is directly proportional to the input across the tone scale. One photon comes in, one goes out. Ten go in, ten go out. But human visual perception doesn't work that way. It is non-linear. It brightens darker tones more than proportionately to how it perceives lighter tones. To reproduce how humans perceive brightness in a digital imaging environment, a Gamma factor is applied to the input values, such that the resulting output values are brighter in the darker parts of the tonal scale. Gamma encoding to values greater than 1.0 also boost perceived contrast.

If you were to select a Gamma value of 1.0 in this dialog, you would be telling the program to stick with the tonality as produced from the scanner, in which case the Input is equal to the Output and the Gamma is linear, or 1.0. This normally produces a rather flat, dark image (Figure 2.3).

However, once you make Gamma settings larger than 1.0, you introduce more brightness and contrast to the image by remapping a wide range of the image's tones.

Generally, most people would not find a Gamma value of 1.0 a satisfactory starting point from which to begin editing the image – the subsequent changes needed are often very large, as you can perceive from examining Figure 2.3.

Gamma 2.2 is normally a satisfactory setting for any further editing of image brightness and contrast using the tonal adjustment tools in SF8, SilverFast HDR, Lightroom or Photoshop.

The checkbox beside **Gamma Gradation**, **for HDR Output**, if checked, will apply the selected Gamma value to SilverFast HDR scans that are opened in Photoshop or Lightroom. Otherwise HDR scans will have linear Gamma.

The Auto Menu

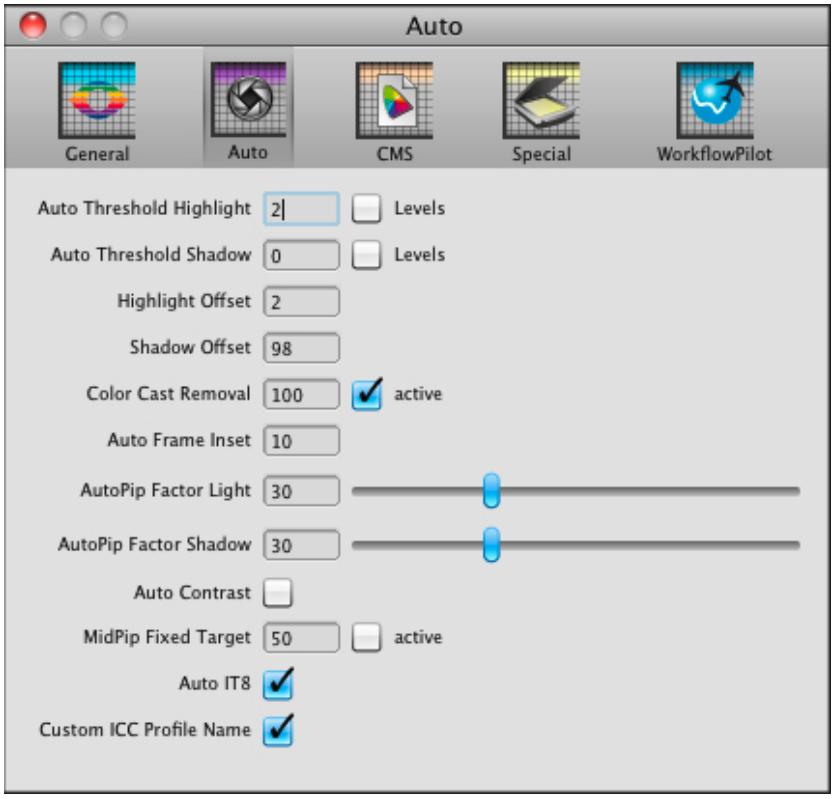


Figure 3.3 Auto Preferences

Click on the **Auto** icon (second from left, Figure 3.3) to access these options. For those who prefer automated workflows, SF8 provides a number of choices in the **Auto** menu of Preferences. These choices (the ones shown in Figure 3.3) determine how the application will adjust the image when you trigger the **Auto** tool (**Automatic Image Optimization** - the one after **Prescan** in the horizontal toolbar, Figure 3.3a, red arrow).

Figure 3.3a Auto Tool

I generally don't use **Auto** adjustment of images, because I find that optimum scanning quality usually requires custom settings for each image, but others may see merit in doing a first approximation using an automatic adjustment process that uses presets which short-cut custom decision-making for each scan.

The key thing to avoid is any auto setting that actually damages the image, say by clipping needed image data in the highlights, the shadows, or by excessive colour saturation.

You may find that different combinations of settings work better for different kinds of images. You can enter this panel and customize the settings as appropriate. None of it need be "cast in stone".

Auto Threshold Highlights and Auto Threshold Shadows:

All the tones in an image from the darkest black to the lightest white are represented on a luminosity scale progressing from black at the left end to white at the right end of an RGB histogram (Figure 1.1, and much more in Chapter Seven). At the extreme ends of this scale, not every level of black or every level of white is discernible in a print. For example, even using high quality glossy papers, the bottom four levels of black would usually be quite indistinguishable, and likewise for the top five levels of white. Furthermore, at the black end of the scale, most of the information in the very blackest levels could well include more scanner noise than useful image data.

The threshold controls allow you to eliminate these extreme tone levels (by typing in the provided boxes the number of tone levels at each end of the scale you wish to be ignored), such that the remainder of the image tones are "spread-out" across the full luminosity range. This allows better visual distinction of the usable dark and bright tonal values.

The default settings are 2 in each case, which are safe settings. While the available range is much greater, I generally don't recommend exceeding a value of 5 for blacks or whites without having done some careful experimentation to determine which values work best for your images in your working conditions. For these settings to become effective, you need to check the "Levels" boxes to the right of the boxes where you set the values (Figure 3.3, two top rows).

Highlight Offset and Shadow Offset:

These preferences (Figure 3.3, third and fourth rows) relate to the boundary values to be set for the brightest and darkest points of the image when the objective of the scan is to destine the image say to a print process that cannot reproduce the blackest blacks and the whitest whites that the scanner can reproduce.

The scale is a percentage scale whose values are a percentage offset from the scanner white-point and black-point. You may enter any value between 0% and 100% in these boxes. I generally prefer to leave these settings at 0 and deal with tone mapping the scan to the print when making the final image adjustments most suitable for the particular printer and paper in the printing application. However, for an automated workflow where you want to obtain effortless tonal similarity

between the range you produce in the scan and, say, that of a printer or a printing press, it can be handy to set these values at several percentage points above zero, or at whatever values experience and experimentation indicate to be most appropriate.

Color Cast Removal:

A colour cast is an overall colour imbalance tinting the image with a uniformly false hue. This preference (Figure 3.3, fifth row) determines whether the colour cast is completely or partially removed when triggering Auto adjustments; it does this by determining the positioning of the **Colour Cast Removal** slider at the bottom of the **Expert** section of the Histogram panel (**Ai Studio**), (Figure 3.3b).

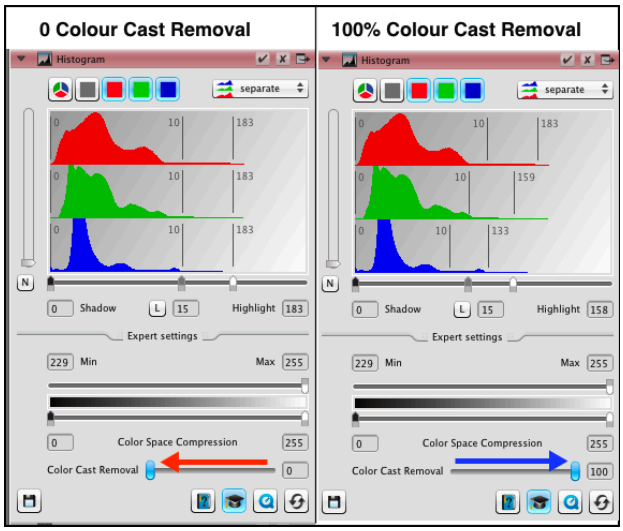


Figure 3.3b Colour Cast Removal

The left panel (Figure 3.3b, red arrow) shows the histogram settings when Colour Cast Removal value is set to 0; the brightness levels of all three channels are identical. The right panel shows how the relative tonal range of the individual colour channels in the histogram (vertical lines showing brightness level adjustments) is altered when the Colour Cast Removal Slider is set to 100% (Figure 3.3b, blue arrow). Varying the tonal range of the individual colour channel sliders so as to de-emphasize the colour of the cast is what removes the cast (Chapter Eight).

The setting you enter into the Colour Cast Removal box in Auto Preferences (Figure 3.3, fifth row) automatically enters the Colour Cast Removal value in the Histogram tool (Figure 3.3b, right panel). I normally leave Colour Cast Removal set at 100%, as there are seldom reasons for wanting a systematically less than total removal of a colour cast. Recall, these preference settings affect every image you work on until you change them. If, however, you wish to preserve a colour cast – for example a sunset image – you would not include cast removal in an automatic adjustment process.

Auto Frame Inset:

This setting (Figure 3.3, sixth row) determines the percentage of the image frame that the application will subtract when measuring the image's tonal values for automatically determining brightness and contrast settings. For example if you were to scan a negative with some of the "black" border for creative reasons, you wouldn't want the black frame to distort the automatic measurement of the image's own tone values (whose deepest black may not be as black as the black frame). To prevent this from happening, you would choose an inset here sufficient to exclude the black frame and thereby include only the tonal values from the actual scene. The values you type in to the box cannot exceed 80%. This is only for assuring correct auto-exposure. It does not affect how much of the image enters the scan.

AutoPip Factor Light; Autopip Factor Shadow; Auto Contrast:

If you trigger **Auto CCR** to automatically correct an image, these preference settings affect image brightness and contrast over a very broad range of "mid-tones". The upper one (Figure 3.4, right panel, 7th row) is for lightening the mid-tone values of images that are systematically too dark (increased brightening as you move the slider to the right), and the one just below it for darkening mid-tone values of images that are systematically too bright (increased darkening as you move the slider to the right). These settings directly affect the shape of the Gradation Curve and the Histogram, key image luminosity control tools discussed in Chapter Seven.

The default settings are 30 for each (Figure 3.4, before triggering the **Auto CCR** icon). You would normally only depart from these defaults if you were dealing with many images having systematic upper or lower mid-tone problems that these settings can mitigate. I provide illustrated comparisons of what these settings do.

Figure 3.4 AutoPip Light & Shadow in Default Positions Value 30
*Before clicking **Auto CCR** for automatic adjustment*

*Figure 3.4a AutoPip Light at Value 30 brightens the image when **Auto CCR** is triggered*

*Figure 3.5 AutoPip Factor Light Value 30 + **Auto Contrast** On*

Figure 3.6 AutoPip Light 52 + Auto Contrast

Figure 3.6a Autopips both 0, with Auto Contrast Active

Figure 3.4a shows how the image's mid-tones are brightened as a result of triggering **Auto CCR**, because the value of 30 indicates a positive adjustment to the extent of "30". You may observe in the left panels of Figures 3.4 and 3.4a that in 3.4a all the points (except the topmost and bottommost) on the curve are higher on the graph compared with their positions in 3.4. This indicates a moderate extent of tonal brightening (The Gradation Curve is further explained in Chapter Seven).

Now, in **Figure 3.5**, I've built on to Figure 3.4a by activating **Auto Contrast** (checking the box next to **Auto Contrast** (right panel, 9th row). After checking that box, closing Preferences and triggering **Auto CCR** again, you can observe that the image's contrast has moderately increased (slightly brighter light areas and slightly darker dark areas), making the image look a bit "snappier". This too shows in the Gradation curve of the left panel, where the lower half of the curve portraying the darker tones is somewhat lower than it is in Figure 3.4a, and the upper half portraying the lighter tones somewhat higher, making the curve steeper. A steeper Gradation curve means more image contrast.

In **Figure 3.6**, I've built on to Figure 3.5 by increasing the value of the Autopip Highlights control from the default value of 30 to a new value of 52 (right panel). This has brightened most of the image compared with the view in Figure 3.5, as also evident especially comparing the upper portion of the Gradation Curve in the left panel of Figures 3.5 and 3.6.

Auto-Contrast is an independent setting from the two **Autopip** sliders immediately above it. Both of those could be set at **0** (no automatic brightening and darkening), and as long as **Auto Contrast** is checked on, SF8 analyzes the image and increases or decreases contrast accordingly – in the example above at a darker overall brightness range, as seen comparing Figure 3.6a with Figures 3.6 and 3.4.

Mid-Pip Fixed Target:

The **MidPip** is the **Neutral** setting controller in the **Pipette** tool located in the tool column to the right of the Dock (figure 3.7). It can play two roles: an automatic adjustor of mid-tone brightness and gray balance, or a gray balancing tool only.

Figure 3.7 Pipette Tool & Neutral Controller

You control how the Neutral Controller performs using the **MidPip** settings in **Auto Preferences** (Figure 3.3, third row from the bottom). If you leave the **Active** box **un**checked, it will be a gray-balance tool only, affecting the colour balance of the image while leaving brightness alone. If you check the box it will affect brightness as well. I discuss first what these two functions are, and then how they operate as a result of the choices one can make in Preferences.

As an **adjustor of mid-tones**, this tool can be used to remap middle gray luminance values (brightness) and in so doing, alter the luminance of most of the image.

As an **adjustor of gray balance**, it converts the selected point to gray (from whatever hue it had before) and remaps all the other hues in the image proportionately. As such, if you know a point in the image that is truly supposed to be gray, but isn't because of a colour cast, this is an excellent tool for removing colour casts. I demonstrate it in Chapter Eight. There are no settings in **Preferences** that need to be made or amended to use the Neutral Pipette for dealing with colour casts, and none of the settings discussed just below affect it.

Returning to the **role of mid-tone adjustor**, this is only activated by checking the **Active** box. Normally, I leave it unchecked, because I value this tool for its colour balancing functionality alone; I handle mid-tone luminance in other ways. However, of interest to those who wish to use this tool for systematically adjusting mid-tones in a given manner, here's what happens.

In **Preferences>Auto**, the default value for this function is 50, which is middle gray in a scale of 0 to 100. First you check the **Active** box, then you select any number between 0 and 100 for indicating how much you want to remap middle gray in your image. Higher numbers in either direction from 50 means more remapping relative to the starting point. Numbers upward from 50 brighten and numbers downward from 50 darken. The changes to image luminance you make with this tool are directly keyed to the Output Histogram in the "Picture Settings" panel.

To show how it works, I'll use the LSI IT8 target for scanner calibration and profiling, The gray box just under number 11 (Figure 3.8, inside the orange frame by the red arrow) is 50% Gray ("middle gray"). I leave the value for the **MidPip Fixed Target** in **Preferences>Auto** at default 50, close Preferences, open the Pipette by clicking on it and click on **Neutral Point** (Figure 3.7). I hover the cursor (which becomes an eyedropper) over the image to the point I wish to make neutral gray, in this example the grey in the orange box in Figure 3.8. I click on the target point. Change should be minimal, if any, because I am at default middle-strength for the tool, mapping middle gray.

In the following demonstrations, I purposely make excessive adjustments, in order to make the logic of the results they produce very obvious. In normal work, you would use much more modest adjustments to achieve sensible results.

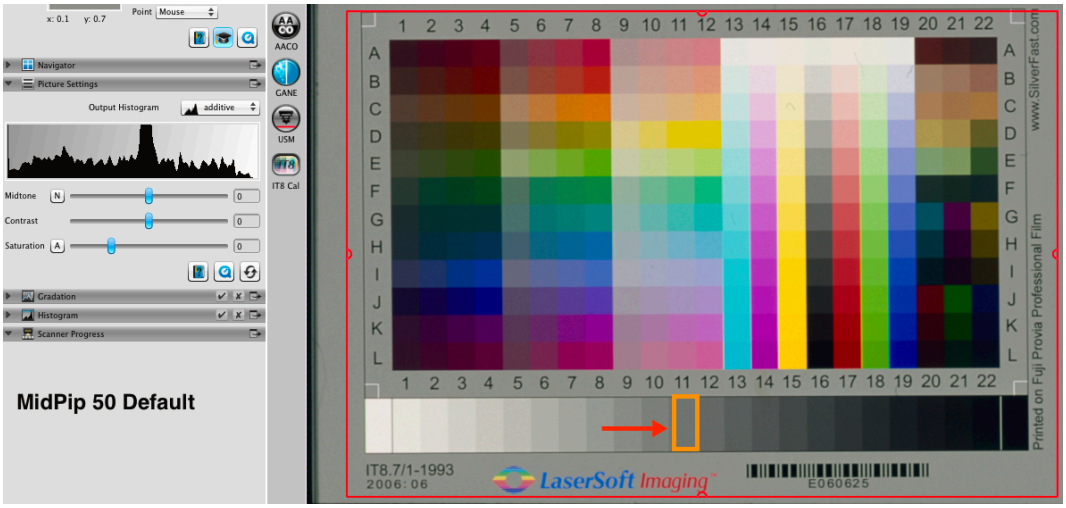


Figure 3.8 Middle Gray

Now, I do **CMD Z** to remove the previous point, enter **Preferences>Auto** and change the value of the **MidPip Fixed target** to 10. I close **Preferences**, Click open the **MidPip** tool, click on **Neutral Point** and drag the cursor to the same middle gray square and click. Notice in Figure 3.9 how dark most of the target has become. This is because middle gray in the target has been remapped to a value of 10 (rather than 50) and everything else changes in proportion except the extreme highlights and shadows. Notice how most of the tones in the histogram have shifted to the left (darkening).

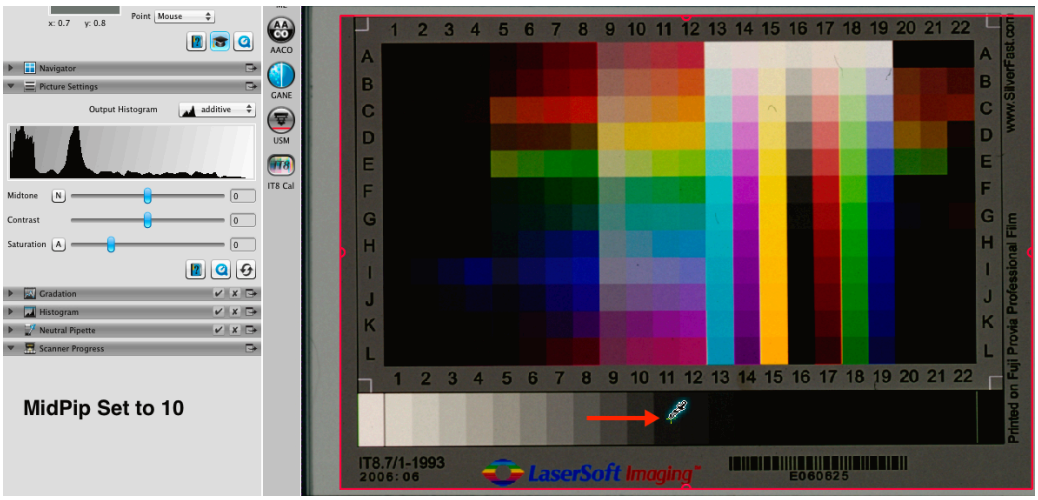


Figure 3.9 MidPip Changed to 10

The image is reset to the default appearance by repeating **CMD Z** or clicking on the **Pipette** tool and clicking on the fourth option **Reset Auto**.

I repeat the same demonstration, this time with the **MidPip Fixed Target** value changed from 10 to 90. The result is in Figure 3.10.

Figure 3.10 MidPip Change to 90

Notice how most of the image has become very bleached and most of the tones in the histogram have shifted to the far right (lightening). And now you know – this is a powerful source of image adjustment needing to be set with great care, if changed at all.

There are "permutations and combinations" you can do with this tool. I revert to the default **MidPip Fixed Target** value of 50 in **Preferences**, with the **Active** box still checked, and show what happens if I remap the tonality of the grayscale by making

lighter gray into middle gray (Figure 3.11). I do this by clicking the neutral **Pipette** on a light gray tone.

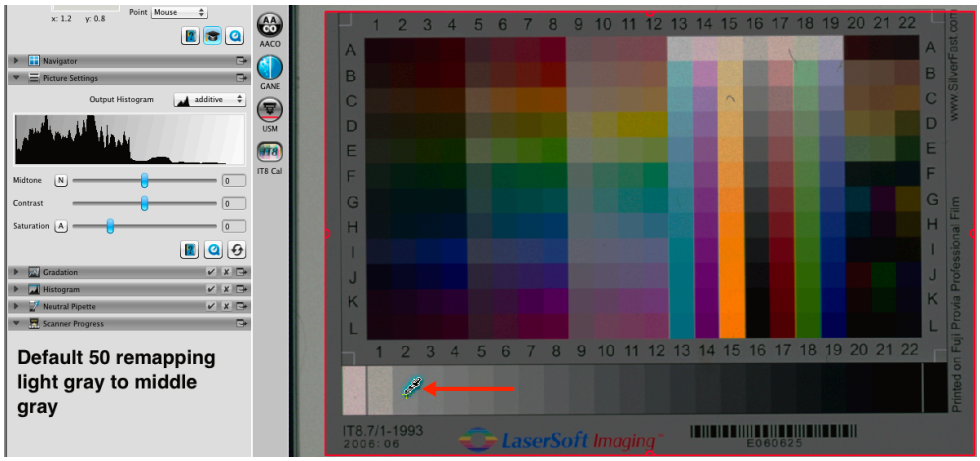


Figure 3.11 Remapping Light Gray to Middle Gray

This shifts the whole image darker because a light shade of gray has been converted to middle gray and almost everything else reacts proportionately. The Histogram shifts leftward (darker).

The opposite effect happens if I remap a dark shade of gray into becoming middle gray (Figure 3.12). I do this by clicking the neutral Pipette on a dark gray tone. The Histogram shifts rightward (lighter).

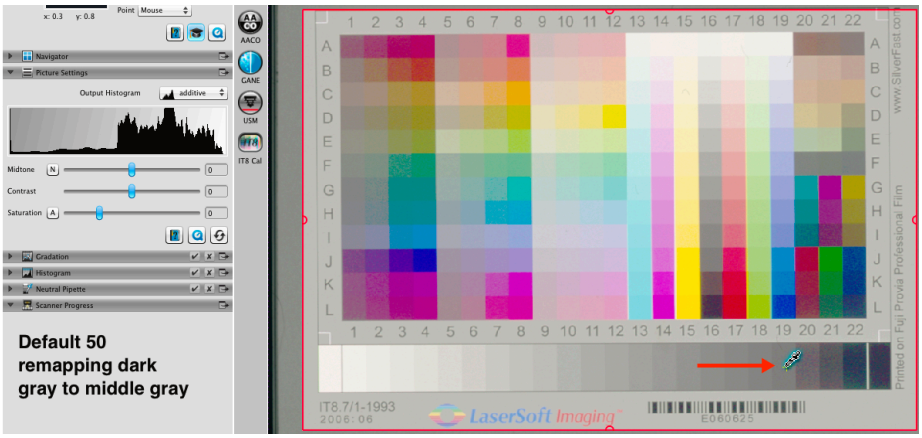
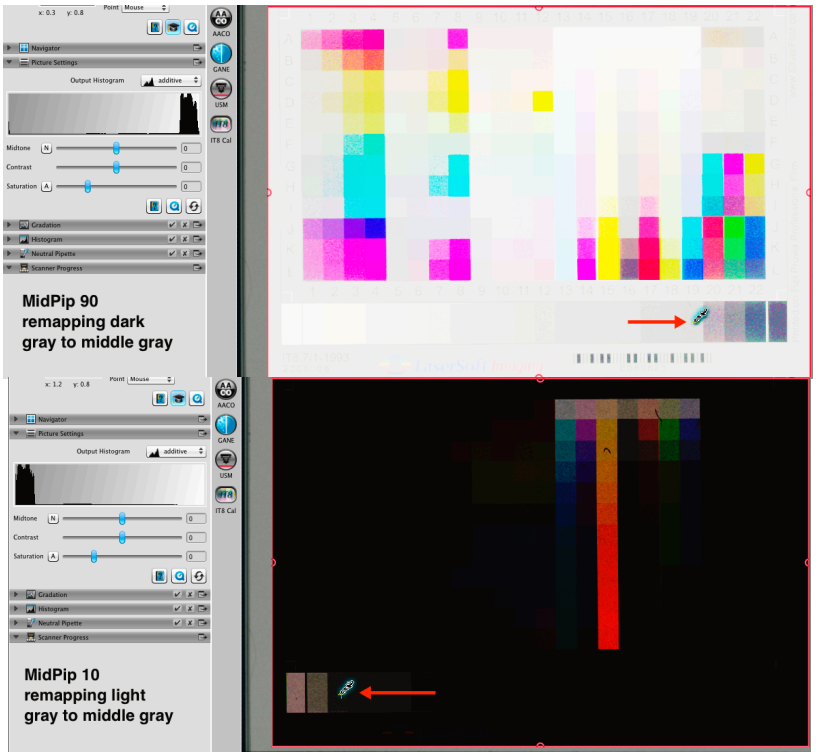


Figure 3.12 Remapping Dark Gray to Middle Gray

Now, if you're like me, you'd be asking what happens if we compound a lightening Preference setting onto a lightening remapping of grays, and a darkening Preference setting onto a darkening remapping or grays. Well, I couldn't resist doing it, and the answer is – no surprise – things get even much lighter and much darker than what I showed above (Figures 3.13 and 3.14 below respectively).



Figures 3.13 (upper) & 3.14 (lower)

Well, OK, so you get to remap just about anything into anything else in SF8, but maybe I should pull back a bit and do the opposite. It becomes much less exciting so I don't illustrate the impacts, but as you could guess correctly by now, if I use a darkening **Pipette Target** setting (below 50) and use it to remap a darker gray into a lighter gray, or a lightening **Pipette Target** setting (above 50) and use it to remap a lighter gray into a darker gray, these settings and moves offset each other, so the impacts are much more moderate.

I've presented these permutations and combinations to show how powerful this tool can be, and also to make the point that it should be set with care, because once you select a value for **MidPip** with the box checked **Active**, it will adjust any image to which you apply these settings when you use the **MidPip Neutral** tool on it.

Auto IT8 Calibration:

Check this box if you intend to create a scanner profile using SF8's very good **Auto-IT8** calibration and profiling tool (for supported SF8 versions). I discuss scanner profiling in the context of Colour Management below.

Custom ICC Profile Name:

When you create a custom profile using the above-mentioned **Auto IT8** calibration and profiling tool, by checking this box SF8 allows you to enter a custom name for your profile, rather than letting the application automatically assign a name. I highly

recommend checking this box. In this way, you can name your profile in a way that will enable you to identify it more easily in your Profiles folder whenever you need to do so.

Special Preferences Menu

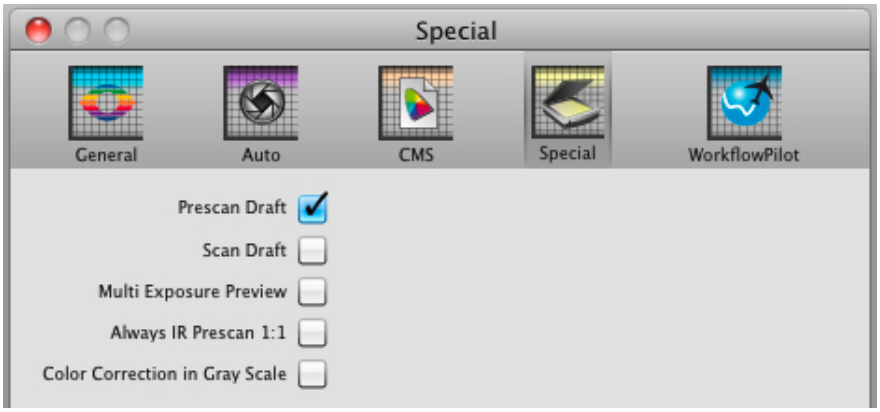


Figure 3.15 Special Options Menu

Prescan Draft (not available on some scanner models): This is active by default. It makes a quick preview scan. It relates screen pixels relative to scan frame size and uses less resolution to make the prescan than if the feature were disabled. This reduces prescan quality. If you want higher quality prescans for editing your images, which I recommend, then you should leave this feature unchecked, and go to **Preferences>General**, and select a value greater than 1 for the **High Resolution Prescan**. You do this by clicking on the arrows in the bespoke dropdown menu. I recommend that a value of at least 2 would be sufficient for most purposes – but this will take more time. As usual, there is a trade-off between time and quality, because the higher the resolution of the prescan, the better will be your ability to precisely edit the image.

Scan Draft:
Checking this option will allow faster "draft" quality scans with some scanner models, for example the Epson V700/V750 models. This can be handy for doing preliminary layout work.

Multi-Exposure Preview: This is a new feature in SF8 that shows how the image would look with **Multi-Exposure (ME)** activated. **ME** makes two exposures – one at normal speed, and a second at much slower speed. This is a hardware-based tool. The slower pass exposes the CCD to more light, bringing out more detail in the dark tones; then the two exposures are combined, keeping the best information from both exposures. If you are using **ME**, I recommend that you activate this preset.

If you are scanning colour negatives, and using **ME**, it will be necessary to refresh the automatic orange mask detection tool. This is done in the Negafix panel by clicking the **Expert button>Expansion tab>Auto: uncheck and recheck**. In Figure 3.15a the **Expert** button is the one highlighted in blue, bottom of the panel third in from the right. The **Expansion** tab is by the blue arrow and the **Auto** box to be checked and unchecked is by the red arrow.

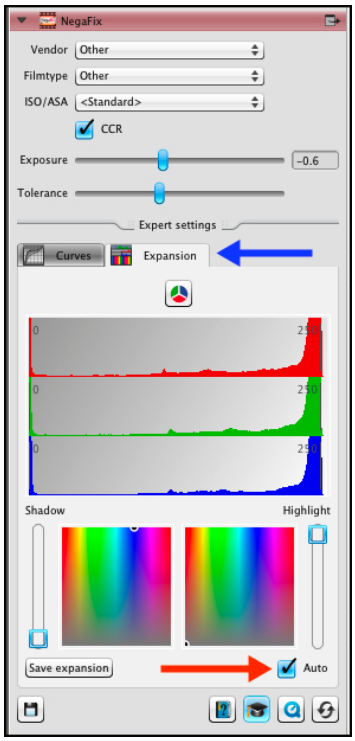


Figure3.15a

Color Correction in Grayscale: This is a new option in SF8. With this feature active, if you make edits to a colour image in RGB mode, and then switch to, say, 16-bit grayscale, the edits you made in RGB mode will be preserved. However, if you do not have this preference active, the edits made in RGB mode will be lost when you switch to Grayscale.

WorkflowPilot Menu

The purpose of these preferences is to establish the tools that will be available to the Guided Workflow Pilot (and hence you can use in that mode), depending on the source of the scan and its purpose. Hence, based on its considerable research into customer requirements, LaserSoft Imaging customized these preferences for each possible combination of **Source** and **Task** (Figure 3.16, red box), for example **Slide** and **Print** respectively. Notwithstanding these defaults, you may over-ride them with your own choice of tools for each combination of **Source** and **Task**. To do this, you must be in **Manual** Mode (the red globe in the upper-left corner of Figure 1.6), then go to **Preferences>WorkflowPilot** (Figure 3.16) and make the choices you wish.

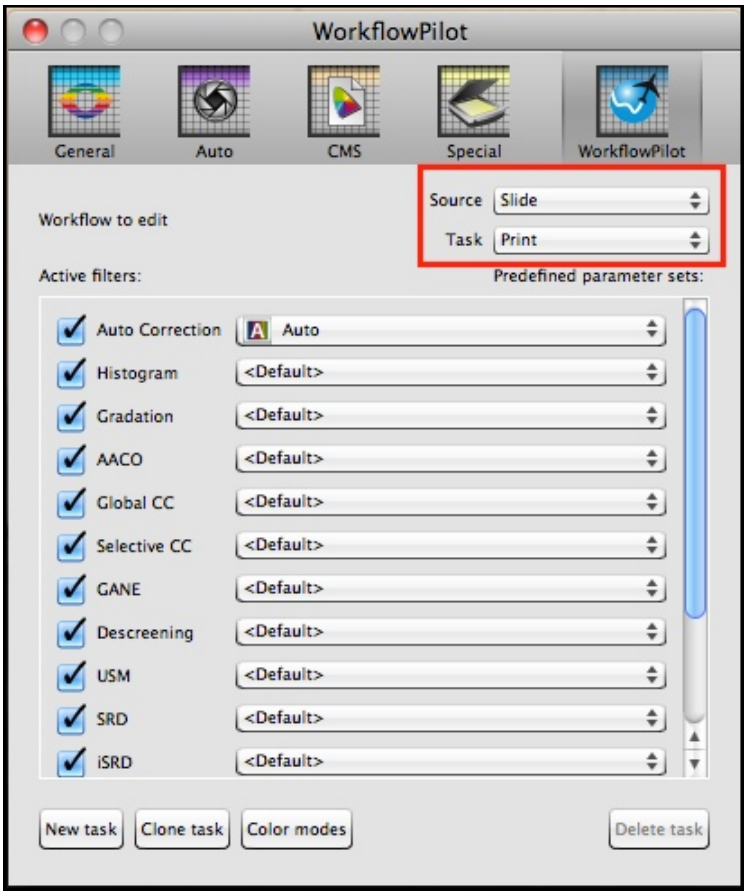


Figure 3.16 Guided Workflow Pilot Menu

These preference settings allow you to do two things: firstly, to select which tools you wish to include as part of the Guided Workflow Pilot for each set of **Source** and **Task** and secondly, to select from the optional settings provided for some of them.

I recommend the default selections, with the possible exception of the **Auto Correction** tool (see below), if you're not sure you like how the latter performs on your images. If you wish to include others that are not selected by default, you do this by placing a checkmark in each of the boxes to the left of the tool name, whereupon the box will turn from white to blue. All the checked items will then appear in the **WorkflowPilot** adjustment path on the SF8 **WorkflowPilot** interface. The unchecked items will not be there. If you don't wish to use a particular tool when you are working on an image, you can skip the step; but if it is not there to begin with, you don't have the choice. I think it best to leave all choices available, again with the possible exception of **Auto Correction**.

People in a hurry to get a basic "first draft" of their scan may appreciate the **Auto Correction** feature, but I leave this turned off, because I'm not in a hurry and I prefer to fully customize all the settings as appropriate for each image. That said, for those who prefer to include **Auto Correction**, if it makes settings you don't like, you can correct them in the individual tools as the work proceeds. This is very much a

matter of how you like to work. People who like starting from a programmed approximation of correct settings will appreciate this feature; people who like building their image adjustments from the unadjusted original (my preference) would keep it turned off.

Now, for the tools you have turned on in **Preferences**, some of them provide options that you can select in the corresponding dropdown panes to the right of the tool name. (You can also leave them all at **<default>** and proceed to work on your images.) Once you make a selection, you can change it to another at will. You may find it handy to select one preset for a particular batch of images having similar characteristics and then revert to another setting for other images.

I recommend that you test the appearance of a chosen setting on a typical image before confirming it. You do this by selecting an option, closing the **Preferences** panel, migrating to that tool in the **WorkflowPilot** and observing the impact. If you don't like it, examine what you don't like about it, go back to **Preferences>WorkflowPilot** and choose another preset for that tool, or select **<default>** and make manual adjustments when the **WorkflowPilot** takes you to that step.

I now show you the presets for the tools allowing choices.

(1) Auto Correction: Clicking on the Auto pane opens a drop-down menu of options shown in Figure 3.17, which I've bounded in an orange box. Unless you are processing a batch of images that could work best with one of these presets, I recommend that you simply leave the preference set on **Auto**.

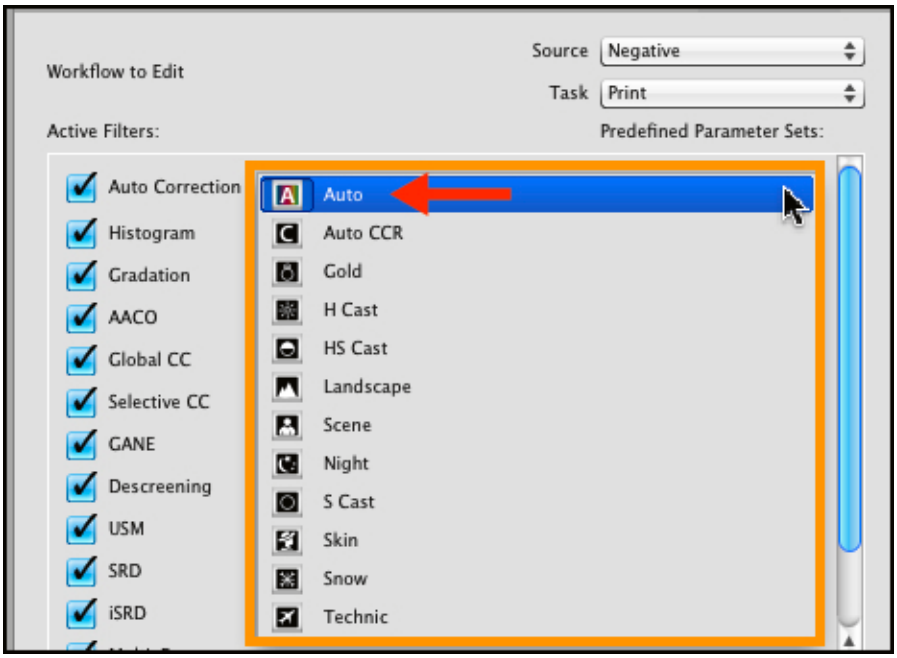


Figure 3.17 Auto Adjust Presets

(2) Histogram: As you see in Figure 3.18, apart from the **default**, you may systematically increase or decrease exposure.

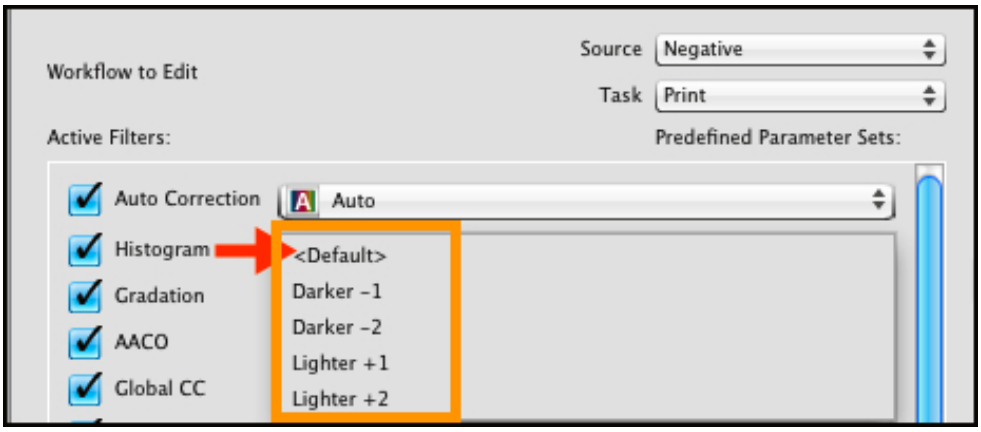


Figure 3.18 Histogram Presets

If you are working on a batch of images that are systematically over or under exposed, you may find it efficient to select one of the compensating exposure settings. Hence, for under-exposed images you would select one of the "**+**" **Lighter** options, and for over-exposed images one of the "**-**" **Darker** options.

(3) Gradation: As shown in Figure 3.19, you can select alternative contrast levels as your default.

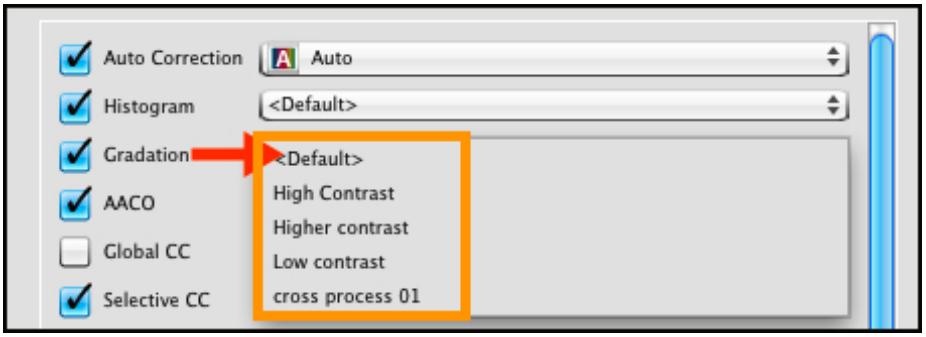


Figure 3.19 Gradation Curve Presets

Unless you have a batch of images that are distinctly under or overly contrasted, I recommend you leave this option set to **<Default>**. If your images are systematically too contrasted, you may find it helpful to select the **Low Contrast** preset, but if they not contrasted enough, then select one of the higher contrast presets.

(4) Global CC (CC = Color Correction): You have here the choice of a warming option or the default (no warming).

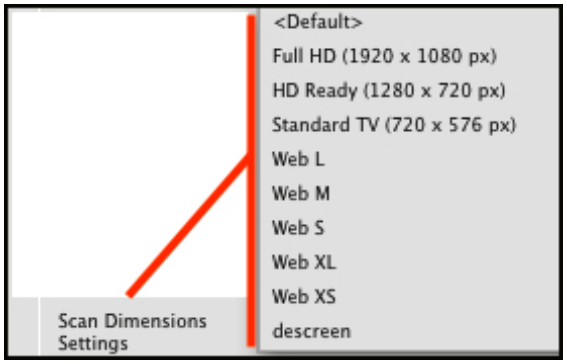
(5) Selective CC : Apart from the default, the options are **ACR50** or **Infrared**. **ACR50** is used to adjust red saturation in combination with other edits to achieve special effects, while **Infrared** is there to emulate infrared film.

(6) Descreening: Descreening is a process for removing the dot pattern that underlies printing screens visible in some printed media. The choices here are for **Art Print**, **Magazine** or **Newspaper**. Select according to the media for which you will use the descreening tool. These options are necessary because the screens differ between them.

(7) SC2G (=Selective Color to Gray): If you are scanning to 16-bit (grayscale), the choices will adjust the Black and White effect to replicate what a conventional B&W film photo would look like if made with one of the type of filters provided in the drop-down list, for example, infrared or sepia.

(8) NegaFix: Your options here are to leave it on (**<default>**), or to leave it on but provide for **no correction**.

(9) Scan Dimension Settings: This set of options only appears if one of your Tasks is a descreening operation. It will preset a range of possible output formats you may be using systematically, as shown in this list from the drop-down menu:



Color Modes/Bit Depth:

For the **WorkflowPilot** mode only, this option selector determines which of the scanning colour modes/bit-depth will appear in the colour mode/bit-depth dialog, third icon at the head of the Dock (Figure 3.20 far right, yellow arrow). Click on the **Color Modes** button in Guided Workflow Pilot Preferences (Figure 3.20 red arrow) and the dropdown menu **Select Color Modes** will open (Figure 3.20, center portion, blue arrow). CMD (Mac) CTRL (Windows) & click each of the options you wish to see represented in the **Scan Type** dialog, making sure the ones you want stay highlighted in blue, then click OK. I recommend that you enable all of them.

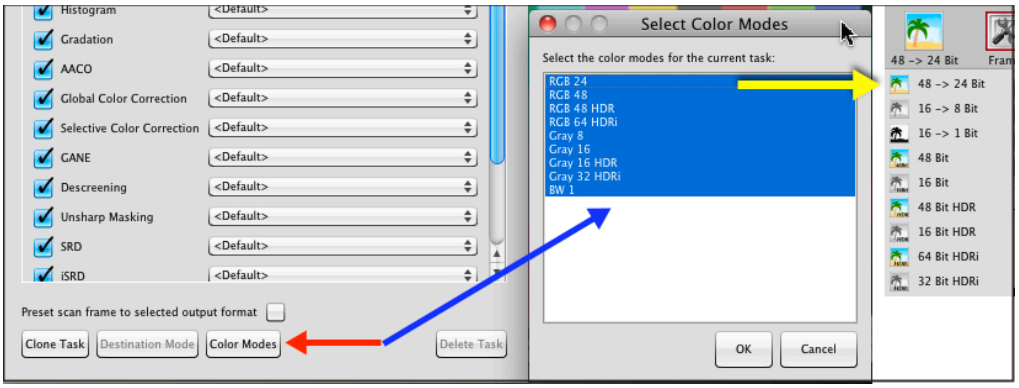


Figure 3.20 Color Modes in Guided Workflow Pilot

3.2 Colour Management in SF8

I introduce several key concepts of colour management and then explain the implementation of colour management in SF8.

Firstly, let us say what colour management is NOT: it is NOT colour correction of images. If you have an image suffering from an unwanted colour cast or faded colour, a good colour management system will reproduce those defects very faithfully, and that is what it should do. Once these defects are remedied, say using SF8's colour correction tools, a good colour management system will also reproduce the corrected image very faithfully respecting the corrections made.

The main purpose of colour management is to achieve predictability of tone[10] and colour between devices, in the sense that "what you see on one is what you'll get on others". This is achieved by maintaining, to the extent possible, consistent colour rendition from one device to another – in our context between the scanner, the display and the printer. Let us see why this is a challenge.

Between different devices, there are differences of colour gamut[11], DMax[12], and how they reproduce colours, but we want consistent colour appearance between them. As well, colour rendering can differ from unit to unit within the same device model; more to the point here, colour rendition of the same image can differ between two scanners of the same model, absent management. Without colour managing these devices, chances are there will be noticeable differences in colour appearance from one to the other, which makes it guesswork to get the tone and colour one expected

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[10] Tone" is lightness or brightness, which varies throughout the image.
[11] "Gamut" is the range of colours represented in a colour space or reproducible from a device, such as a scanner, monitor or printer; in art, you may think of it as the size of the box of crayons or paints – the broader the colour palette the larger the gamut.
[12] "DMax" is a term for the measurement of the maximum black a device can reproduce say either on a display or reflected from a print.

from any particular device. One key goal of colour management is to remove the guesswork and achieve predictable outcomes from the scan preview on one's monitor, to the final scan and eventually to print or web viewing.

The colour of each pixel in an image file has a numeric value. The overall objective of colour management is for the representation of those file numbers to appear as close to being the same as possible across devices. The strategy of colour management for doing so can be described in terms of three key building blocks:

Firstly there is an "anchor" of reference colour values living in a defined colour space independent of devices; it used for describing colours in a standard manner and for calculating colour adjustments so that devices portray the intended colours. This colour space and its set of colour values is based on the CIE-Lab system[13] within which each colour has a specific L*a*b* value (or XYZ value – another colour identification system)[14].

Secondly one puts one's devices into a known state and characterizes how they interpret colour using measurement hardware and software that create profiles;

Thirdly there is software allowing for the translation from what the device actually renders to what it should render based on the colour values for each pixel actually contained in the image file.

This mechanism has four main components worth knowing about here:

- ICC[15] profiles (which describe device colour reproduction),
- Profile Connection Space (PCS), the hub of colour management for transferring and transforming colour data between devices to get consistent results; it sits in the colour management module (CMM):
- CMM, which does much of the math, and
- Rendering Intent (RI), which determines how to handle "out-of-gamut" (OOG) colours[16].

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[13] Such colour spaces were developed on the basis of the work of the Commission Internationale de l'Eclairage (CIE), which in 1931 published the results of its research on the boundaries of human visual perception of colour.
[14] I discuss colour, colour spaces and colour measurement in Appendix 1, including the L*a*b* colour measurement structure; this is useful knowledge for both colour management and measuring light and colour when editing RGB images.
[15] ICC means "International Color Consortium", http://www.color.org/index.xalter
[16] OOG colours are those included in the source colour space but cannot be reproduced in the destination colour space, for example because image pixels have colour values outside the gamut boundary of the printer.

The PCS and the CMM operate "under the hood" in the computer operating system. For setting up a colour-managed workflow, most users need only be concerned with ICC profiles and the Rendering Intent.

Devices (monitors, printers, scanners), through their profiles, display colour spaces that are all smaller than the CIE L*a*b* delineation of colours humans can see. These spaces are closer in volume and shape to the sRGB, Adobe RGB(98) or ProPhoto RGB colour spaces, in increasing order of size (Figure 3.21, where I also show for comparison the shape of the CIE-Lab space and the space for a printer/paper combination of an Epson printer and Ilford Gold Fibre Silk paper combination). One of these RGB spaces is typically embedded in the image for providing a scale to the image file's RGB colour values. The actual colour that a given RGB value will look like when seen or printed depends on this scaling. It's like the amount of wine in a glass that's half full. You need to know the size of the glass to know the amount of wine.

The line plots of these colour spaces and scanner profiles are graphs of the data in their **ICC** profiles, measured and graphed in **ColorThink Pro**[17]. Hence, the plots of the scanners are not a real representation of hardware capability, but rather of the profiles of the hardware, which is what counts in practical application. I used custom-made profiles of specific scanner/film combinations for displaying the scanner "colour spaces". The point of all this is to visualize differing limits and boundary shapes of the colours the devices reproduce; hence, the importance of good colour management to cohere colours as much as possible between devices used in the complete image processing chain from scan to print.

The two things worth observing in Figure 3.21 are the gamut shapes and volumes (a measurement of size). The volumes are listed in Figure 3.21 under the legend of the shapes. All three scanners listed show more volume than ARGB(98), but much less than ProPhoto, while the printer, having one of the widest gamut inkset and paper combinations available today, has less gamut volume than the scanners.

The ICC profile describes how the scanner reproduces the colours and tones presented to it. Creating the profile starts from an image target (in our case the SilverFast IT8 target) having known tone and colour values (in L*a*b* and XYZ) for a series of colour and grayscale patches. These known values for each patch are contained in a reference file that accompanies the IT8 target.

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[17] ColorThink Pro is a trademark of Chromix Inc. a powerful application for image, colour and profile evaluation, assisting achievement of good colour management.

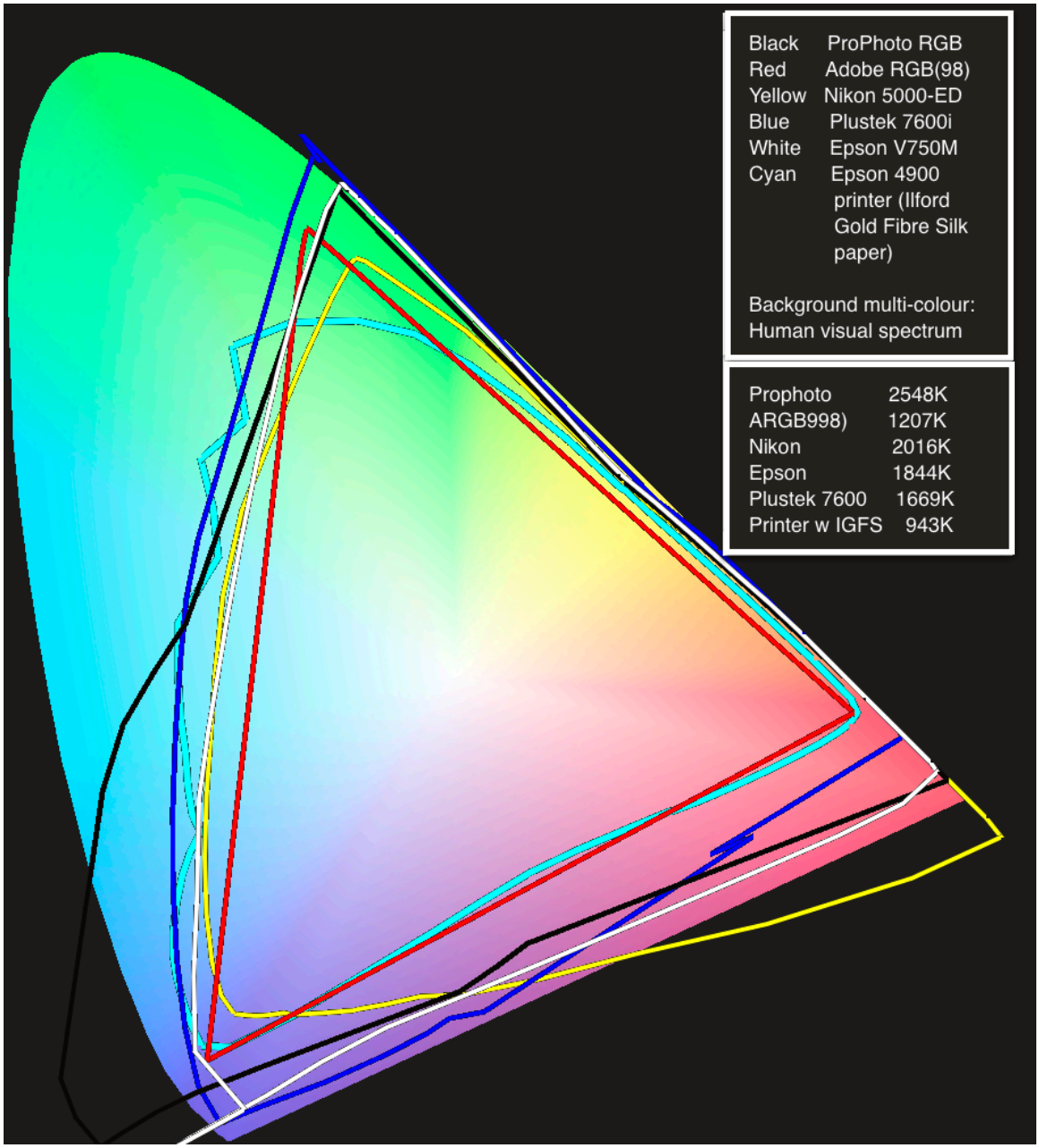


Figure 3.21 Colour Spaces for Several Scanners and a Printer

Typically, the scanner's interpretation of the target's tone and colour values will vary from the colour values in the reference file. Once the scanner is profiled, between the ICC profile, the CMM and the PCS, errors of scanner response are known and can be systematically compensated. Because of this profiling, when you scan an image, tones and colours appear as they should, based on their tone and colour values in the image file. The success of this endeavour requires that the other devices reproducing the image must also be calibrated and profiled (e.g. monitor and printer); however, our focus here is on scanner profiling.

There are three approaches for using ICC scanner profiles in SF8:

(i) Use the generic profiles contained in SilverFast for each supported scanner model and media type (be it Kodachrome, other positive film or reflected media). Easiest and least expensive, but not the most accurate.

(ii) Buy a third-party target and reference file and manually install the reference file in the correct folder on the hard-drive, scan the target, use a third-party profiling software package to calculate the profile and then store the resulting profile in the correct folder on the hard drive, making sure to select the correct profile in **Preferences** when scanning the media for which the profile was made. Accurate, costly and needs work.

(iii) Use SilverFast IT8 targets and the SilverFast **Auto IT8** profile creation tool, available in SF8 **Ai Studio**. This approach normally creates a more accurate profile than approach (i), because it measures the particular response of the individual scanner being profiled, and will do it much more easily than approach (ii), because it requires only a one button click and all the rest of what is described in approach (ii) happens under the hood very quickly.

The FOGRA Institute has tested the profiles created from SilverFast targets and the SilverFast Auto iT8 profiling process and found them to be highly satisfactory[18].

LaserSoft Imaging provides four types of targets: a reflective target for profiling the scanner when used in reflective mode (scanning paper photographs and other materials on paper), positive transparency targets made with Fuji and Ektachrome films, and a another made with Kodachrome. As Kodachrome film is no longer produced and can no longer be processed, once LSI has sold its existing stock of Kodachrome targets, new copies of this target will become unavailable. Kodachrome has unique properties causing the scanner to interpret colours differently than it would interpret the same colours in other types of transparent positive; therefore it is best scanned with its own profile.

Auto-IT8 Scanner Profiling Process

Regardless of the type of the SilverFast profiling target, the **Auto IT8** profiling process is the same. The **step-by-step** is as follows.

(1) Make sure you are connected to the Internet. This may be necessary because in case the reference file is not already bundled within your copy of SF8, the program will read the barcode on your SilverFast IT8 target and automatically download the corresponding reference file from the LSI server and install it on your computer in the correct location. You may also download the reference file directly from the SilverFast website at this URL:
http://www.silverfast.com/it8calibration/en.html

[18] I reproduce the statements from FOGRA in Appendix 2.

(2) For film scanning, insert the transparency target into your scanner's correct frame-holder; for profiling a flat-bed scanner to correctly scan prints, use the SF8 Reflective target; press **Preview** and check that the text in the displayed image of the target reads in the normal way (i.e. it is not back-to-front or upside-down) and that the entire image including the barcode is within the scan frame. **Make sure to frame the target EXACTLY as the instructions show on your display**, otherwise you will get an error message part way through the process.

(3) I recommend that in **Preferences>Auto**, you check the box enabling you to give the profile a custom name (last two items in the menu, Figure 3.3, **Preferences> Auto**). If you do this, when you commit the profiling process, a dialog will appear asking you to name the profile. You can give it any name that helps you to confirm that this is your custom profile for the scanner and media you are profiling.

(4) Press the **Auto IT8** profiling button located in the tool column to the right of the SF8 Dock (Figure 3.22, red arrows).

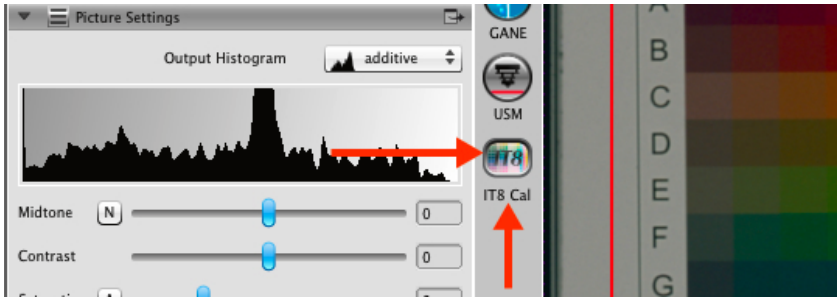


Figure 3.22 iT8 Auto Profiling Command Button

SF8 does the rest. You may verify that the correct profile is loaded by going into SF8 **Preferences>CMS**, and look at the name of the input profile appearing when you have selected the same media type for which the profile was created.

You may make a custom profile for each media type you will be scanning, as between reflective, non-Kodachrome transparencies and Kodachrome. SF8 automatically loads the correct profile associated with your choice of media that you are scanning.

If you wish to test the accuracy of your scanner's tone and colour reproduction using the loaded profile, a manual procedure for doing this is laid out in Appendix 3. In brief, you create an Excel spreadsheet in which to measure the differences between the reference file values for the IT8 target, and the values for the same target patches that you read from a scan of the IT8 target with no image editing activated. A **dE** result using the formula in Appendix 3 of less than 2.0 indicates excellent profile quality. A value less than 5.0 remains acceptable. Once the appropriate profiles are available for loading and use, the next step is to make correct colour management settings in Preferences.

Colour Management Settings (CMS) in Preferences

You should verify that your colour management preferences are correctly set before making a scan. To reach the **CMS** preferences, click **SilverFast>Preferences>CMS**, and a menu (Figure 3.23) will open.

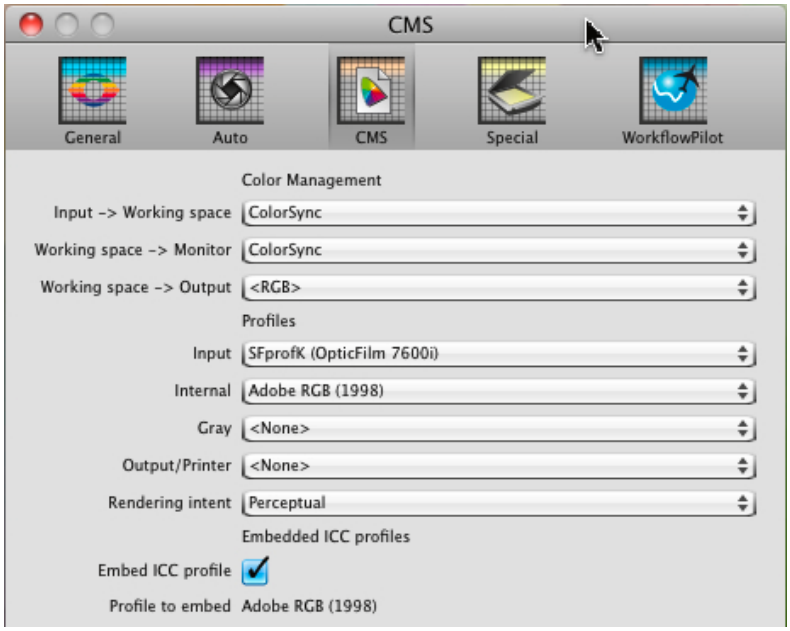


Figure 3.23 Colour Management Preferences Menu

This menu has three sections. The first section, **Color Management** is for deciding whether you want the scanner, your monitor and the final output of the image to be colour-managed. For any of these processes that you want to be colour-managed, you need a profile. Hence, the second section, **Profiles,** is for selecting the profile you wish to use for colour management. The third section, **Embedded ICC profiles** is for deciding whether you want the profile for the working colour space to be included with the image once it leaves SF8.

The first line under **Color Management**, **Input>Working Space** is a dialog asking whether you want to colour manage your scanner. The word **Input** here is generic code for **Scanner**. The choices are **none** or **Colorsync** (Mac) (**ICM** for Windows). If you don't want your scanner to be colour-managed, select **None**.

I generally recommend colour-managing the scanner within SF8, in which case you would select **Colorsync** (Windows: **ICM**). However, there are people who prefer to send unmanaged colour data from the scanner to Photoshop, and then assign a scanner profile to the Photoshop image in order to completely manage the colour in a post-scan workflow. For this option, the correct choice here is **None**.

If you want to colour-manage your scanner, please verify that the correct scanner profile is loaded in the **Input** drop-down pane, which appears as the first row under **Profiles**. Normally, this would happen automatically once you've opened SF8 with a scanner active and you've selected the media type (Transparency, Kodachrome or Reflective). If the correct profile happens not to be there, click on the dropdown pane (Figure 3.24, green or red arrows). A list of all your available profiles will open. Select the correct scanner profile by clicking on it. Figure 3.24 shows a snippet of the profiles list (far right) that appears when you click the **Input** dropdown pane. Scroll the list and select your profile. The selected scanner profile here is the SF8 generic profile for the OpticFilm 7600i (Plustek) scanner, to scan a Kodachrome transparency (Figure 3.24, red arrow, SFprofK (OpticFilm 7600i).

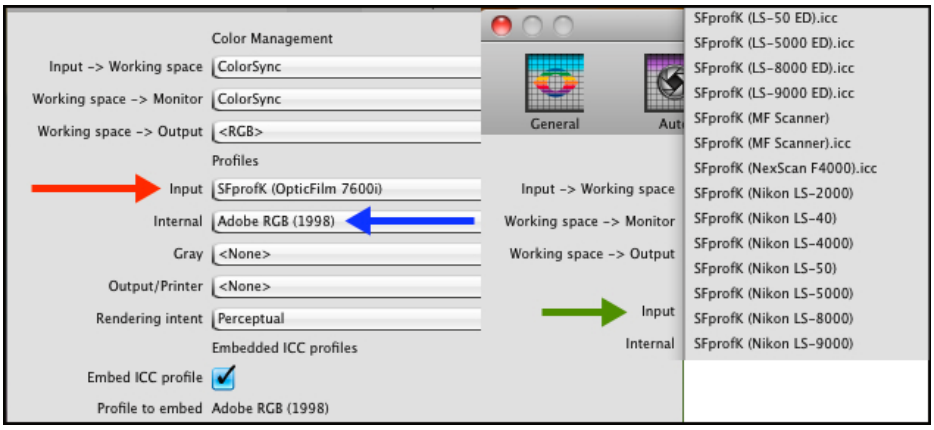


Figure 3.24 Selection of Scanner ("Input") Profile

Reverting to the **Color Management** options above **Profiles**, the second row is labeled **Working Space>Monitor**. This dialog asks whether you want SF8 to recognize your monitor profile. The options are **Colorsync** (**Windows ICM**) or **None**. I can't think of any reason why you would not want your monitor profile to be actively managing the provision of correct colour and tone on your display. This is the profile that governs how your monitor interprets colour and tone. The whole purpose of profiling your monitor is to insure that you see the colours correctly. Hence, the appropriate option here is **Colorsync (Windows ICM)**, which will use your currently default monitor profile. You don't need to select it, hence there is no provision for it under **Profiles**.

The next row, **Working Space>Output**, may be used for softproofing your scans. In a printing context, for example, softproofing simply means that instead of having to make a print to determine whether you are happy with the result, you can preview on your colour-managed display what the final print will look like when it comes out of the printer. It does this is by "reading" the image data using the profile for the printer/paper combination you wish to simulate. This is very useful because the contrast range of your printer will be less than that of the display – usually black is not as black and paper white tends to be off-white. As well, the shape of the printer/paper colour gamut differs from that of the display.

Softproofing gives you an opportunity to adjust the scan right at the scan stage to take these effect into account when making your tone and colour edits pre-scanning, so that there will be no surprises or disappointments when the print emerges from the printer.

To implement this softproofing capability, you need to make two settings in **CMS Preferences** and trigger one instruction in the **View** menu. Under **Color Management** – **Working Space > Output** (Figure 3.24a, third row), select **Colorsync** (Windows **ICM**). Then, under **Profiles** – **Output>Printer**, click the drop-down menu and select the profile you would use for the printer/paper combination of interest (Figure 3.24a, lower red arrow where I have selected a matte paper for the Epson 4900 printer). Then, to see the effect of the softproof, toggle **CMD Y** (or do it in the menu **View >Softproof**).

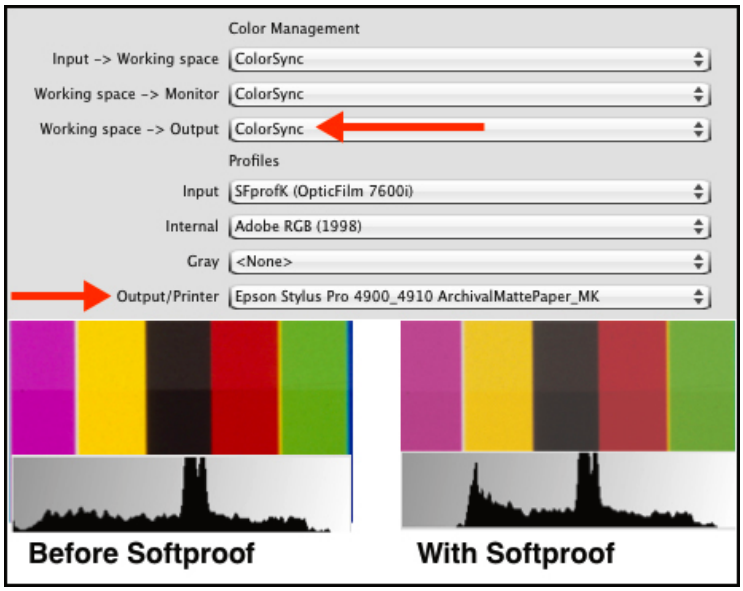


Figure 3.24a Output Profiling

Comparing left and the right colour bars and histograms in the lower portion of Figure 3.24a, it becomes readily obvious – as is well known – that most matte papers do not reproduce the quality of black and colour saturation seen on the display (observe "With Softproof" [Figure 3.24a, bottom right] how the darkest tones are shifted higher on the tone scale and all the colours look duller). If you increase image contrast (and perhaps add a bit of saturation) with Softproof active as a guide, it helps to perceptually bridge this difference.

Now, if you wish to embed this profile in the image so that it will be seen this way in an external application that recognizes these ICC profiles (e.g. Photoshop), you would check the box at the very bottom of the dialog (Figure 3.24) saying **Embed ICC Profile**. This kind of output profiling can also be useful for images being

destined to a printing press, in which case a CMYK press profile that simulates the press output would be selected for **Output/Printer**.

All that said, as a general rule, unless you know for sure that a scan will be used in *one and only one* manner, I do not recommend embedding output profiles in scans. This is because an output profile characterizes only one specific output device; however, you may wish to purpose your scan to different devices; and indeed for printing - different printing papers have different contrast and colour rendition characteristics that won't necessarily match the embedded output profile you used for the scan.

One can just about get the best of both worlds by using the softproofing set-up described here for editing the image, but before making the scan, going back into **CMS Preferences** and disabling the output profile by selecting **<RGB>** for **Color Management** in **Working Space>Output** and under **Profiles** in the **Output/Printer** pane, selecting **<none>**. Of course the image would still have been edited based on the output profile used in the softproof, but that profile will not end-up embedded in the image. Should you want to purpose the scan to a device or paper other than the one used for softproofing, re-adjusting such edits of a 48-bit scan to suit another kind of output would generally be minimally destructive working in Lightroom or Photoshop.

In the **Profiles** section of the **CMS Preferences**, the second row, **Internal**, is a necessary entry for specifying the colour space you wish to embed in the image. **Internal** is generic SilverFast code for the working colour space you use, such as sRGB, Adobe RGB(98), ProPhoto RGB, etc. There could be any number of listed profiles in this drop-down menu. It depends on how many are in your profiles folder in your computer. In Figure 3.24, for example, the selected one is **Adobe RGB(98)**, by the blue arrow. You select it by clicking open the **Internal** dropdown pane under **Profiles**, scrolling the list and clicking on the profile you want.

The most common colour spaces to select here would be sRGB, Adobe RGB(98) [ARGB98] or ProPhoto RGB, in increasing size of working colour space.

sRGB would be a suitable choice if you were *absolutely certain* that you will <u>never, ever</u> do anything more with these images other than to display them on the internet or in portable devices.

For print, I recommend either **ARGB(98) or ProPhoto RGB**. The choice between these two spaces essentially depends on what gives you better results, overall. The usual advice is to use the widest available, such as **ProPhoto RGB**, because today's inkjet printers can reproduce colours that exceed parts of the **ARGB(98)** colour gamut, and monitor technology is headed in that direction too. Speaking of which, having your display profile active in **Preferences>CMS** is important.

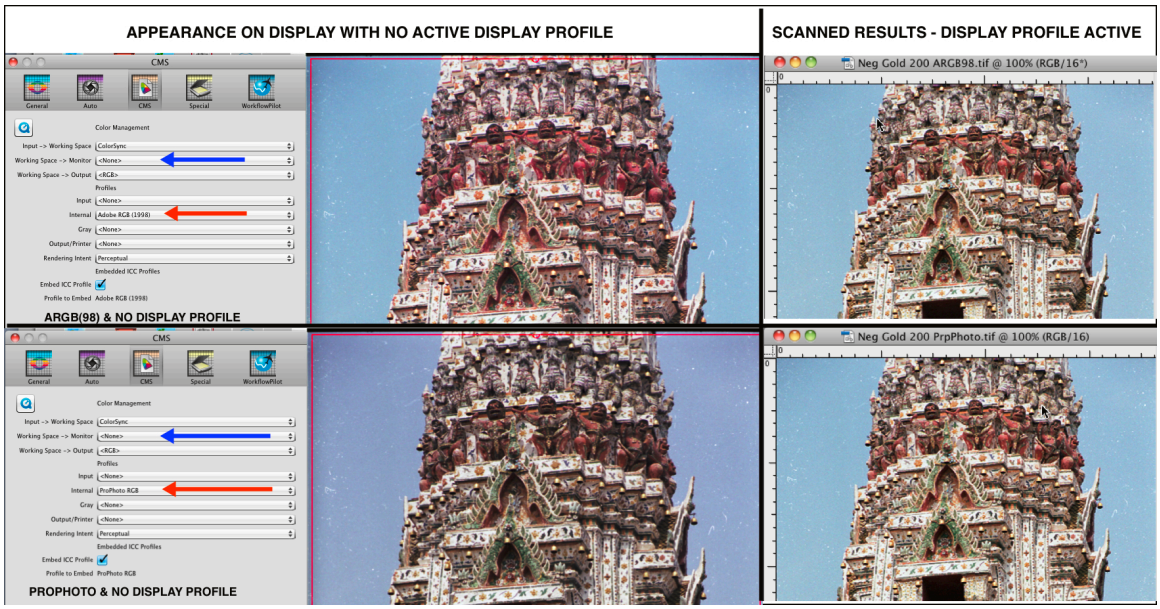

APPEARANCE ON DISPLAY WITH NO ACTIVE DISPLAY PROFILE
SCANNED RESULTS - DISPLAY PROFILE ACTIVE
ARGB(98) & NO DISPLAY PROFILE
PROPHOTO & NO DISPLAY PROFILE
Neg Gold 200 ARGB98.tif @ 100% (RGB/16*)
Neg Gold 200 PrpPhoto.tif @ 100% (RGB/16)

Figure 3.25 Display Profile Inactive (left); Active (right)

When the display profile is inactive (Figure 3.25 left panels, blue arrows showing **<none>** in profile selection for **Working Space>Monitor**), colour rendition in both ARGB(98) and ProPhoto will be incorrect and inconsistent (Figure 3.25 left and center panels, ARGB98 upper; Prophoto RGB lower – red arrows showing the selected working space profiles). IF all the visible colours are in ARGB(98) gamut, the colour rendition will be just about the same and look just about the same in the scanned results and on the display with the display profile active, whether the scan was performed in ARGB(98) or ProPhoto RGB working spaces (Figure 3.25 right panel – ARGB(98) upper; ProPhoto RGB lower). The bottom line here to assure greatest consistency of display appearance with results is to make sure your display profiling is active in SF8, and use ProPhoto working space to insure that you have a large enough container for all the colours, just in case your image contains colours that exceed the Adobe RGB(98) working space boundaries. With ProPhoto, you should scan in 48-bit or 64-bit HDRi modes.

In the **Profiles** section of **CMS Preferences**, you may leave **Gray** set to **<none>** unless you intend to print a grayscale scan edited in SilverFast alone. If you are, much as discussed above you could softproof with a relevant grayscale profile.

Rendering Intent deserves a selection. It is a colour management term for determining how the colour management system will deal with out-of-gamut (OOG) colours. OOG colours are those that fall outside the scope, or gamut, of the relevant colour space. We can use Figure 3.21 to visualize this. A colour that fits within **ProPhoto RGB** may be too saturated to fit within the colour space available to your printer/paper combination - note the differences of colour space size in Figure 3.21 for **ProPhoto RGB** versus Ilford Gold Fibre Silk paper in an Epson 4900 printer (about as wide an inkjet printing space as one can get nowadays).

In our immediate context, your scanner colour space is most likely wider than the **sRGB Internal** colour space. Hence, with this combination of profiles, you could well have quite a few OOG colours in normal photo scans. This is one reason why I recommend using an **Internal** working colour space wider than **sRGB**. When a colour is OOG, the colour management system needs to know how to deal with it, and that is what **Rendering intent** does.

By clicking on the **Rendering Intent** pane in **CMS Preferences**, a drop-down menu will open giving you the four choices shown in Figure 3.26.

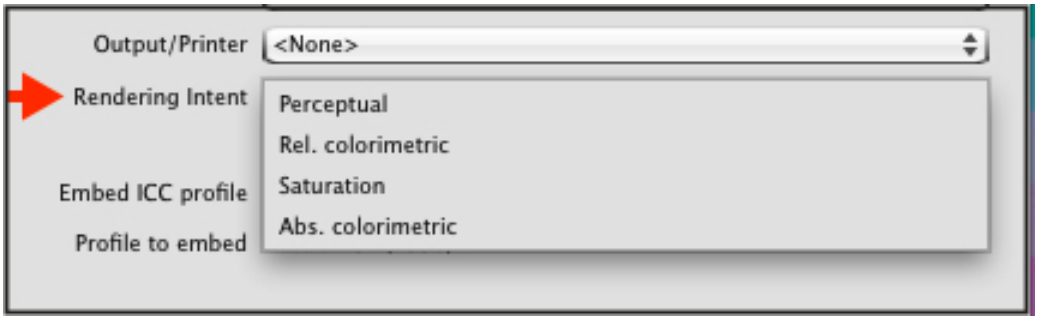


Figure 3.26 Rendering Intent Options

The two options most commonly used in photographic work are **Perceptual** and **Relative Colorimetric** (the first two on the list). **Perceptual** renders the OOG colour to its nearest colour that is in-gamut, and then it attempts to preserve the perceptual colour relationships in the photo even if it requires remapping colours that are in-gamut. **Relative** does not do any remapping of in-gamut colours. The normal recommendation is to use **Perceptual** if the image has many OOG colours, but otherwise to use **Relative**. This is largely a matter of judgment. Don't be afraid to experiment and see what looks best for your image. But make a deliberate choice.

Finally, under **Embedded ICC Profiles**, you decide whether to embed the working colour space (**Interna**l) profile with the image. If you leave the box by the green arrow in Figure 3.27 **UN**checked, no profile will be embedded. If you check it, you embed the **Internal** colour working space profile (if you are not embedding an output profile as discussed above).

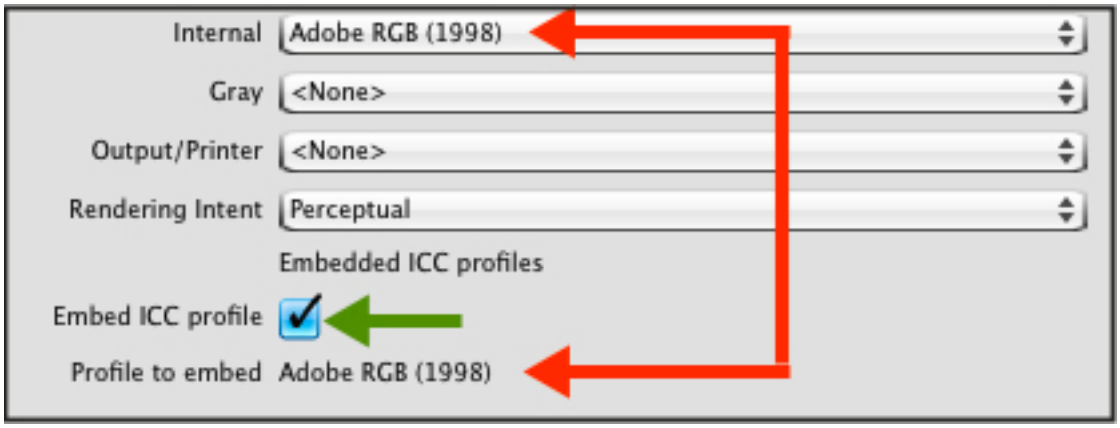


Figure 3.27 Embed the Working Space Profile

Embedding it is normally a good thing to do, because it tells the next application working on the file, e.g. Photoshop, how to interpret the RGB colours. Without an embedded profile defining the working colour space, the RGB numbers are meaningless because they have no frame of reference, or scale (think of less than perfect analogies to see this: (i) half a glass of wine doesn't mean much unless you know the size of the glass; and (ii) your GPS can't guide you to your destination unless it has a map and knows your coordinates); therefore Photoshop would pull-up a **Missing Profile** warning (Figure 3.28, if you have your warnings enabled, which I recommend) and provide you with options for dealing with how Photoshop should interpret the colour data it is being given.

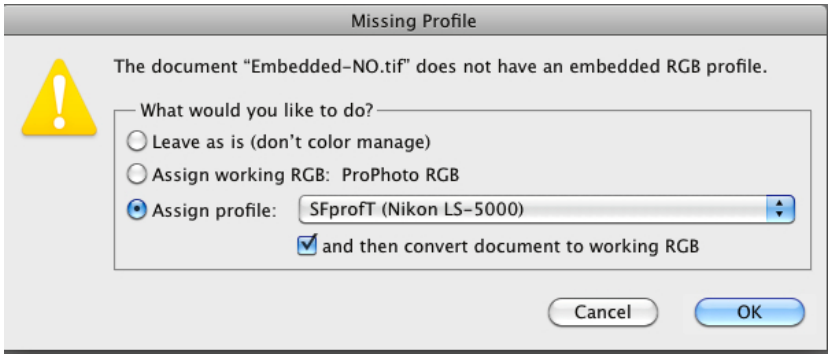

Missing Profile
The document "Embedded-NO.tif" does not have an embedded RGB profile.
What would you like to do?
Leave as is (don't color manage)
Assign working RGB: ProPhoto RGB
Assign profile:
SFprofT (Nikon LS-5000)
and then convert document to working RGB
Cancel
OK

Figure 3.28 Photoshop Missing Profile Warning

Even if you select "Leave As Is", it will deploy the current Photoshop Working Space (here ProPhoto RGB), because it needs a frame of reference for interpreting the file numbers and rendering colours. Selecting either of the other two options in Figure 3.28 will embed the selected profile and provide different colour interpretations depending on the profile selected. It does this without changing file numbers. If you select the same scanner profile that you would have used had you embedded that scanner profile in SilverFast, the image will look just about the same under both procedures (Figure 3.29). General recommendation: Assign the scanner profile and convert the document to your working RGB space.

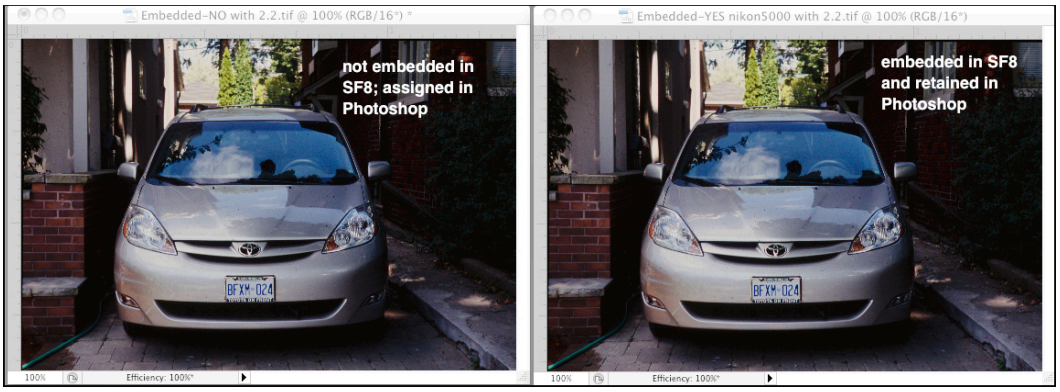


Figure 3.29 Embed Profile in SF8 versus Photoshop

3.3 Colour Management "Quick and Easy" Summary Step-by-Step:

I've been through a fair bit of discussion about colour managing your scans. The purpose of course is to enhance the quality and predictability of results from your workflow. The objective of all these settings is to assure that the colours you see on your display at the Prescan stage are as similar as possible to the colours you'll see from the scanned final output photo, whether on viewing devices or in a print[19].

To achieve this within SF8, the few steps needed are:

- Calibrate and profile the scanner; use of SilverFast's A**uto IT8** functionality (**Ai Studio** or **HDR Archive Suite** versions) is an easy way to do this.
- Make sure the scanner profile is selected in **CMS Preferences>Input**;
- Select an appropriate Internal colour working space in **CMS Preferences**; for scanning, I suggest this would often be Adobe RGB(98) or ProPhoto RGB;
- Enable **ColorSync** (Mac) or **ICM** (Windows) for both the **Input>Working Space** and **Working Space>Monitor** colour management options;
- Select an appropriate **Rendering Intent**;
- Embed the colour working space (**Internal**) profile in the **Profiles** section;
- Your monitor, and if you print – your printer, should also be calibrated and profiled with ICC or ICM profiles for your printer/paper combination.

While I generally recommend SF8's colour management for assuring predictability and matching of colours between applications and devices, it's also true that provided you have a good scanner profile outside the SilverFast system, you can elect to not select the scanner profile at the scanning stage, but rather assign it to your image when you open it in Photoshop and then convert the image to the

[19] For printing, the application from which you print should be capable of allowing you to soft-proof the image, so that you can make final adjustments using an image preview that simulates on your monitor how the photo will look on your chosen printing paper when viewed by reflected light. Photoshop has a soft-proofing function, Lightroom 3.x does not, but Lightroom 4 **Process 2012** does.

working colour space (e.g. ARGB(98) or ProPhoto RGB). SF8 makes it possible to do this by allowing you to easily turn off the colour management options in **Preferences>CMS,** by selecting **<none>** in the **Color Management>Input-Working Space** or **Profiles>Input** sections of the CMS Preferences interface. In this way, SF8 accommodates to your preferred working procedures.

The foregoing discussion is adequate to handle your most immediate colour management requirements for SF8.

3.4 Colour Management of Three Workflows:

Only if you think you need to know, I demonstrate the implementation of colour management options as they pertain to three workflows between SF8 and other applications:

1. SF8 to SilverFast HDR
2. SF8 to Photoshop
3. SF8 to Lightroom

(There is more on this in Chapter Ten for migrating an image from SilverFast HDR to Photoshop and Lightroom.)

1. Colour-managing a Scan between SF8 and SilverFast HDR[20]

In this workflow, one of the HDR scan modes is being selected (e.g. 48-bit HDR), because the intention is to open the scan in SilverFast HDR for further processing.

At least two profiles are required for a colour-managed workflow to deliver correct colour – in the case of scanning, the scanner profile ("Input" in SilverFast) and the colour space profile ("Internal" in SilverFast)[21].

If you have no scanner profile and no colour space profile selected in SF8 **Preferences>CMS** and you proceed to create a scan in an HDR mode, when you open the file in SilverFast HDR, because you have no profile embedded in the image file, a **Profile Selection** dialog will open that looks like this (Figure 3.30):

[20] SilverFast HDR is still in Beta, hence aspects of the application could change. The guidance I provide here is valid at time of writing, and safe general practice.
[21] Monitor and printer profiles are also needed for correct viewing and printing.

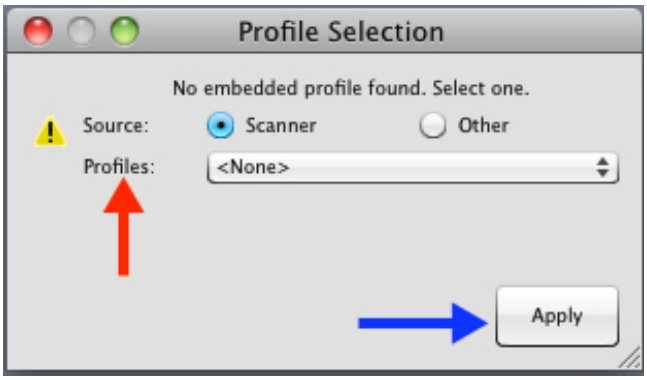


Figure 3.30 SilverFast HDR Missing Profile Selection Dialog

At this point, firstly, you should profile the image otherwise the colours and the luminance will be wrong and you will have needless trouble correcting them. Secondly, this dialog allows you to make one choice: either the **Scanner** profile or an **Other** profile (depending on the radio button – Figure 3.30 - you activate). The **Scanner** selection gives you access to all your scanner profiles and the **Other** selection gives you access to colour spaces and other profiles. I recommend you select the **Scanner** source, click the drop-down pane to the right of **Profiles** (Figure 3.30, red arrow) and select your scanner (input) profile. Then click **Apply** (Figure 3.30 blue arrow). Then enter **Preferences>CMS** and verify/select your colour space (internal) profile (Figure 3.31 red arrow). **Colorsync** (or **ICM**) should be active in **Color Management Input>Working Space** and **Working Space>Monitor** (Figure 3.31, orange arrows). Your CMS choices should look akin to those in Figure 3.31.

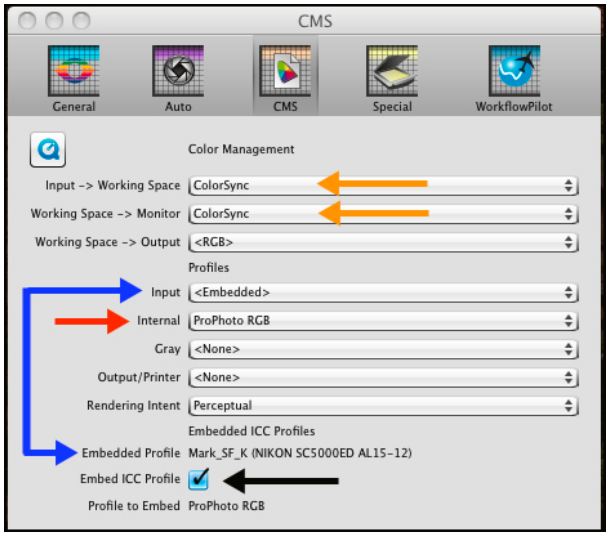


Figure 3.31 Appropriate Profile Selections in HDR Preferences>CMS

As such, the correct scanner profile will be selected (Fig. 3.31, blue arrows) and the appropriate colour space profile selected (Fig. 3.31, red arrow). Also check the box to **Embed ICC Profile** (Fig. 3.31, black arrow), so that the image will open correctly profiled in another external editor (e.g. Photoshop) if you so wish to do so.

If you are scanning from SF8 in an HDR mode for further processing in SilverFast HDR, I recommend that you select your scanner (input) profile in SF8, make the scan to HDR, and open the image in HDR. In HDR **Preferences>CMS** the correct scanner profile will show (Figure 3.31, blue arrow). Once there, check that the color space (internal) profile is the one you want to use. If not, select the desired one in the **Internal** drop-down (Figure 3.31, red arrow).

Figure 3.32 below shows the difference between a profiled and an unprofiled scan in SilverFast HDR after an elementary histogram adjustment (same for both images) was made to improve brightness and contrast.

Figure 3.32 Adjusting an HDR Image with versus without colour management

2. Colour-managing a Scan Between SF8 and Photoshop

Setting aside SilverFast HDR, in this section I show three ways of colour-managing a scan directly between SF8 and Photoshop. These are:

A. Complete colour management in SF8
B. "No Color Management"
C. No colour management in SF8, but management implemented in Photoshop

I've purposely set the colour space in SF8 to ARGB(98) and the working colour space in Photoshop to ProPhoto, because for demo purposes I want to be sure to get profile mismatch warnings when I open the SF8 scan in Photoshop. These warnings can and should be enabled in Photoshop's preferences for **Color Settings>Color Management Policies**.

A. Complete Colour Management in SF8

In SF8 **Preferences>CMS**, I've enabled Colorsync, selected the scanner profile LS-5000-ED and the ARGB(98) colour space and checked the box to embed the ICC profile. The result opened in Photoshop (Figure 3.33) brings up a profile mismatch warning, because the Photoshop working space is ProPhoto and the image file has the scanner profile embedded. I select the option to use the embedded scanner profile. This will assign the scanner profile to the image and preserve it's appearance as how it looked in SF8.

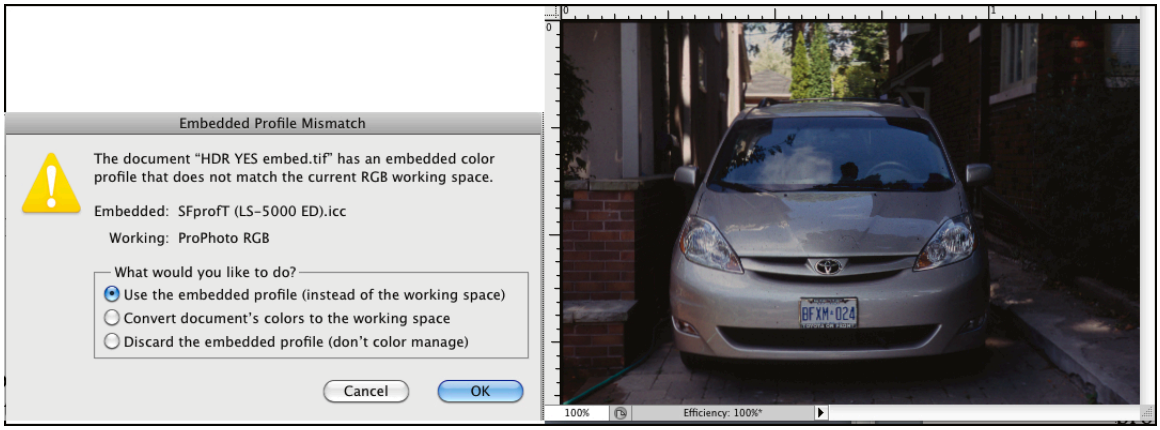

Embedded Profile Mismatch
The document "HDR YES embed.tif" has an embedded color profile that does not match the current RGB working space.
Embedded: SFprofT (LS-5000 ED).icc
Working: ProPhoto RGB
What would you like to do?
Use the embedded profile (instead of the working space)
Convert document's colors to the working space
Discard the embedded profile (don't color manage)
Cancel
OK
100%
Efficiency: 100%*

Figure 3.33 Colour Management in SF8 to Photoshop

This management policy successfully conveys the expected colours and tonality between the two applications.

B. "No Colour Management"

Exactly the contrary of policy **A** above, I turn off all colour management in SF8 **Preferences>CMS** (everything set to **<none>**), AND I do not allow Photoshop to introduce explicit management when the image is opened in Photoshop. To do this, when the **missing profile** warning pops-up on opening the image in Photoshop, I tell the dialog to leave everything untouched (Figure 3.34, "No Color Management").

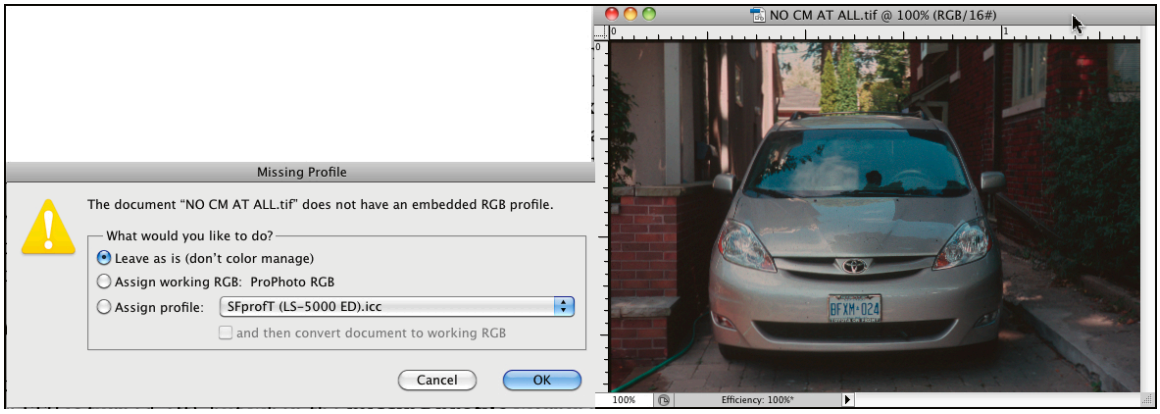

NO CM AT ALL.tif @ 100% (RGB/16#)
Missing Profile
The document "NO CM AT ALL.tif" does not have an embedded RGB profile.
What would you like to do?
Leave as is (don't color manage)
Assign working RGB: ProPhoto RGB
Assign profile: SFprofT (LS-5000 ED).icc
and then convert document to working RGB
Cancel
OK
100%
Efficiency: 100%*

Figure 3.34 No Colour Management in SF8 or in Photoshop

Clearly, this is a very different outcome, and an inaccurate one compared with those for cases **A** and **C**, and compared with the appearance of the slide itself. Recall I said above that there is no such thing as "no colour management". Photoshop needs some way to interpret and render the colour data. Absent explicit management instructions, it maps the file numbers to the working colour space, which in our case is ProPhoto. It produced an image with a reddish cast. Correcting these casts in Photoshop, by the way, can be a tedious process using individual colour Curves adjustments and the outcome can often be less satisfactory than using a correct profile in the first place.

C. No Colour Management in SF8, but Colour Management in Photoshop

In this approach, I repeat the colour management set-up in Case **B** above (colour management in SF8 is turned-off), but when the **missing profile** warning appears on opening the image in Photoshop, I elect to assign the scanner profile (Figure 3.35). I could have also checked the box to "and then convert the document to working RGB". This time, Photoshop knows how to interpret the colours because the scanner profile is assigned to the photo.

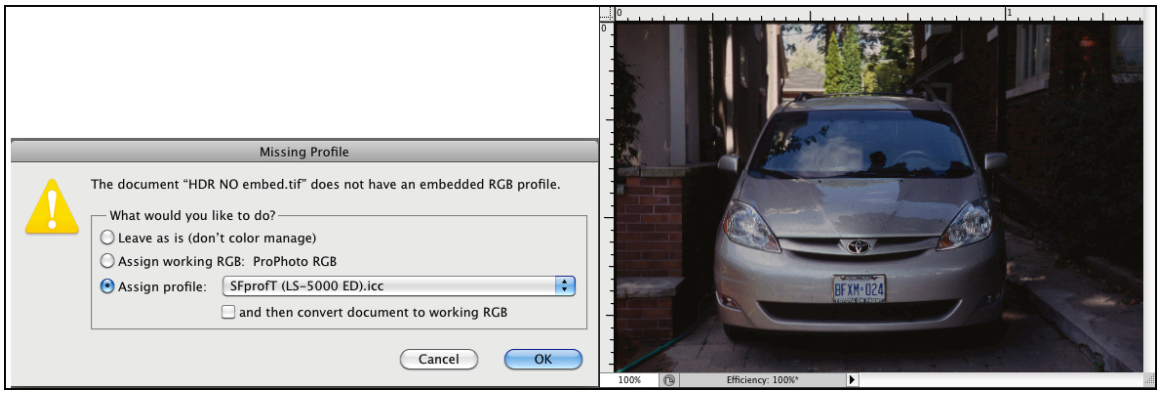

Missing Profile
The document "HDR NO embed.tif" does not have an embedded RGB profile.
What would you like to do?
Leave as is (don't color manage)
Assign working RGB: ProPhoto RGB
Assign profile: SFprofT (LS-5000 ED).icc
and then convert document to working RGB
Cancel
OK
100%
Efficiency: 100%*

Figure 3.35 Assign Profile in Photoshop

As you can see, this result is about the same as that achieved in Case **A**. Hence, either procedure (Case **A** or Case **C**) can be recommended.

3. Colour Management between SF8 and Lightroom

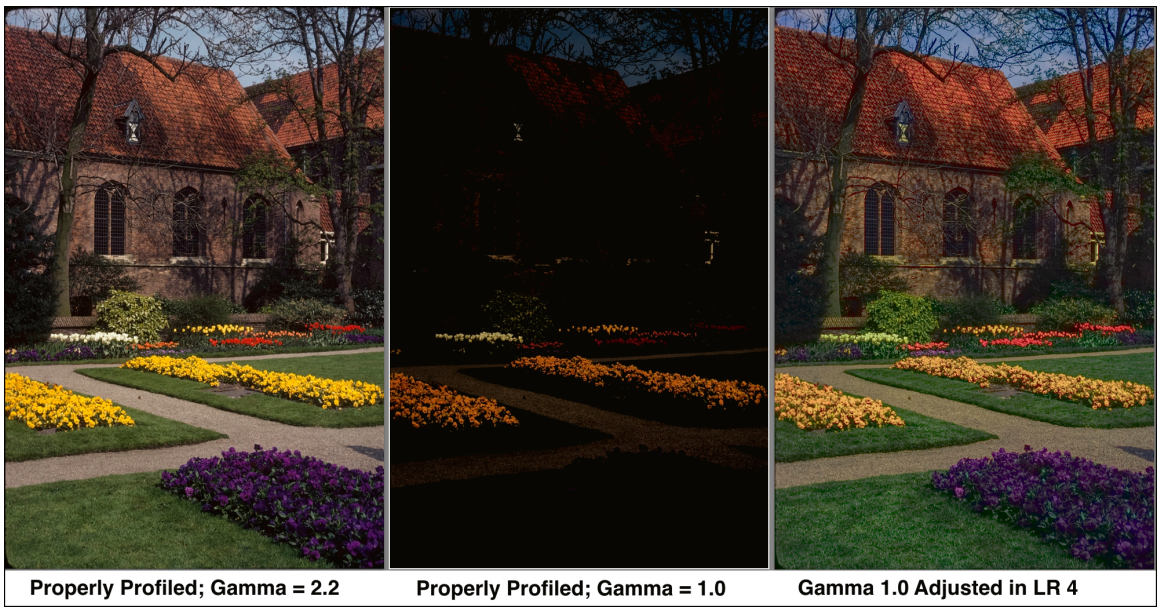
Unlike Photoshop, Lightroom does not generate profile mismatch warnings, and it does not have user-selectable colour working spaces. The size and shape of its colour working space is akin to ProPhoto RGB, except its Gamma is 1.0. This makes it important to decide on the colour management policies in the scanning application if the images are destined to first open in Lightroom.

I illustrate key possibilities and their outcomes. This gives you guidance to experiment for what will work best in your conditions. It's easy enough to do: make different scans with different colour management settings, introduce elementary

histogram normalization (Chapter Seven) label them carefully, and compare results. This is what I do here. I present a series of cases, and the recommendations emerging from them.

They key variables that need decisions are: (i) should I use my scanner profile; (ii) should I embed a colour working space profile, and (iii) should I use Gamma 1.0 or a higher Gamma (such as the usual 2.2)? I'll address each of these questions, starting with (iii), to clear that one out of the way first.

What happens when I send a Gamma = 1.0 scan to Lightroom? Well, not much that you can use satisfactorily (Figure C1 middle). I selected this Kodachrome (shot in the Netherlands, May 1977) because it has a good representation of the key colour groups and luminance values ranging from near-white to near-black.



C1. Gamma 1.0 versus Gamma 2.2

The version on the left is just about what this photo should resemble, based on how it looks in the original slide viewed on a light-tablet designed for correct viewing of transparencies. It was scanned with correct profiles, at Gamma 2.2 and the histogram normalized for good luminance in SF8. It will need only modest luminance tweaks in LR4, not yet done.

The version in the centre is the same image as the one to the left of it, but scanned with Gamma = 1.0. The version to the right is the best I could adjust the Gamma 1.0 version in LR4, after spending about ten minutes working between Exposure, Highlights, Whites, Shadows, and for the yellow-orange hues: Hue, Lightness and Saturation. There is no simple way of optimizing this image in LR4 when it starts life at Gamma 1.0. Other slides performed likewise. So, first recommendation: for this workflow: don't scan at Gamma = 1.0. Use something in the range of 1.8~2.2.

Now, one factor "under-the-hood" in Lightroom that's useful to know is that if you send an image to Lightroom with no embedded profile, Lightroom still needs to know how to interpret/scale the colours. As I said before, "at the end of the day", there is no such thing as "no colour management". The colour values in the image file must be interpreted somehow. Hence if you send an unprofiled image to Lightroom, Lightroom will interpret the image using an sRGB colour space, which could well be too small for the range of colours in your image (especially this one) and feasible in an eventual print. The comparative outcome is that shown in Figure C2, and addresses whether you should embed a colour working space profile.

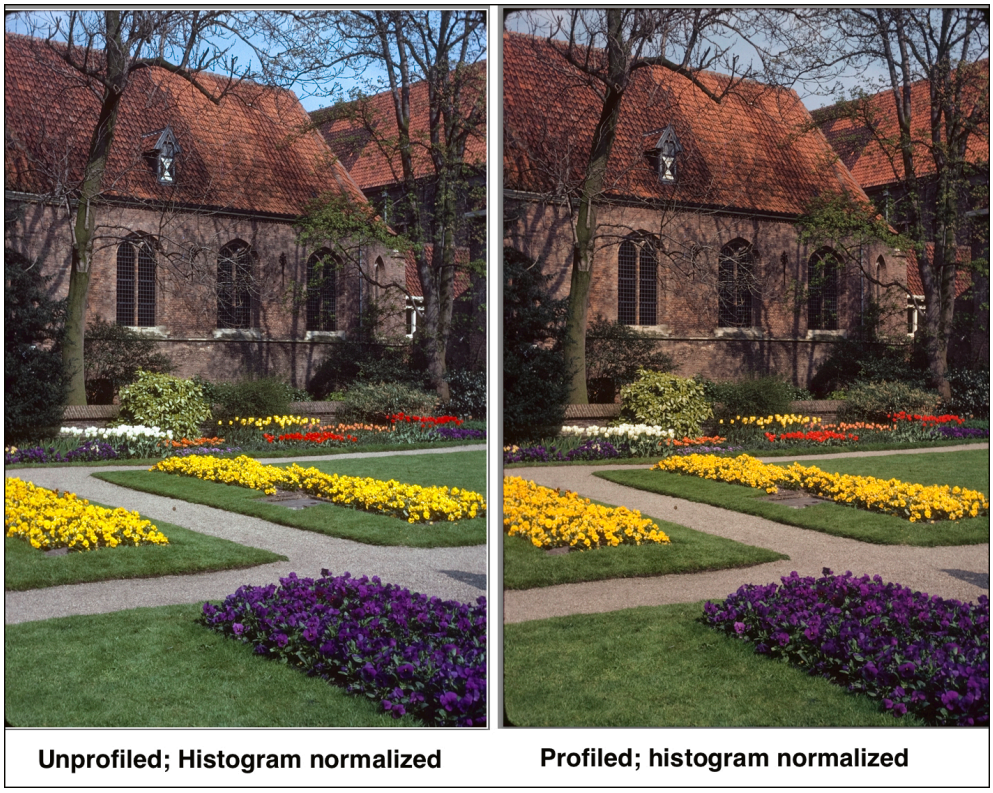


Figure C2. sRGB versus ProPhoto RGB Interpretation

If you find the left-side image looks "weak" compared with the right-side image, that's because it is and it should. Its colour is interpreted within a relatively narrow sRGB colour space, which excludes the more saturated hues that the original media actually contains. And this happens silently, without any warning, except for what you see. Hence the recommendation emerging from this comparison is that if you intend to use a wider than sRGB colour space for images to be further edited in Lightroom 4, embed the wider space using, e.g., SF8's **CMS>Colorsync> Internal>ProPhoto** at the scan stage.

The colours are also "wrong" in the left image of Figure C2, because there is no embedded scanner profile. So the next comparison is to show what happens when the appropriate colour working space is selected, but not the scanner profile (Figure C3).

Figure C3. With ProPhoto, but Without versus With Scanner Profile

This comparison is a bit more "subtle" than the previous ones, because we are getting down to the finer strokes of which is a "more correct" rendition relative to the original media, as viewed on a light tablet. In fact, the left image could pass for "not too bad", unless I knew better, but I do. The more correct rendition is warmer and the sky less of a pronounced blue than seen in the left-side image, but closer to correct in the right-side image. Hence the recommendation emerging from this comparison is that it makes more sense to also embed the scanner profile in SF8 **CMS>Input>Your Scanner Profile**.

The overall conclusion emerging from this series of comparisons is that to properly colour-manage a scan going from SF8 into Lightroom 4, it is best to use Gamma greater than 1.0 (e.g. something in the range of 1.8~2.2), and select both the colour working space and the scanner profile in SF8 at the scan stage.

Not to say that all you necessarily need to do is normalize a histogram, plop the right profiles into the scan software, hit **Scan** and nothing more remains to be done with the image. That would be nice, and one objective of colour management is to help minimize the need for error correction in a post-scan workflow, but "minimize" does not always mean "eliminate", and this image is a case in point.

While the profiled result is "pretty good" and the most correct of all the options discussed above, based on comparison with the media I considered that it could use

a few tweaks. The nice thing about it, though, is how easy these tweaks are when started with an image that has been scanned properly in the first place (Figure C4).

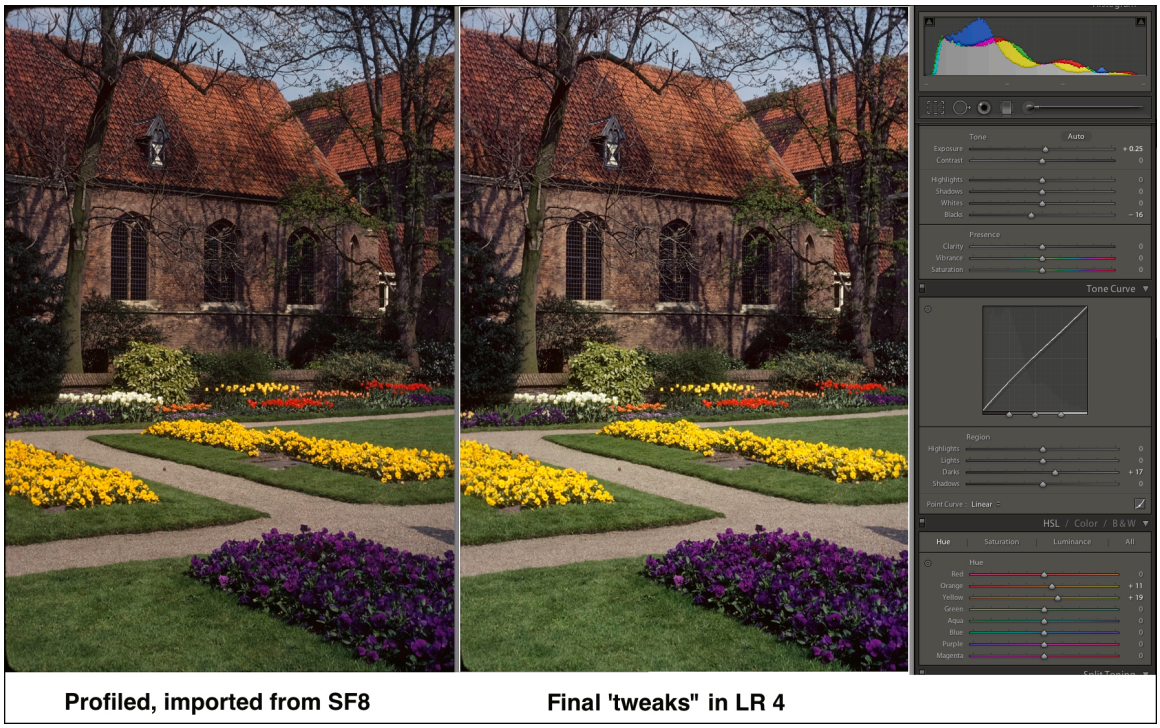


Figure C4. Final Tweaks to Properly Profiled Scan

I thought the whole image could use a bit of brightening, the yellows, brown and oranges a bit too "orangey" and the dark tones a bit heavy. To deal with all of those minor issues I made the moderate adjustments shown in the Lightroom 4 **Process 2012** panel (right side of Figure C4). I increased **Exposure** a bit, very moderately shifted the hues of yellow and orange more toward yellow, and boosted the **Dark** tones a bit in the **Tone Curve** panel, while slightly shifting the **Black** point in the **Basic** panel a bit darker – this latter move preserves contrast in the slightly brightened dark tones and reinforces the colour a bit, having brightened the exposure.

While on the subject of "final tweaks", I should mention that you needn't move an image like this into Lightroom for this purpose alone. As I'll be showing in much detail in Chapters Seven and Eight, SF8 has its own toolset for making adjustments to luminance and colours. But the important point that needs to be made here is that colour management in SF8 is good enough to achieve remarkable colour consistency across colour managed applications, such that the work you do in the scanning part of the workflow will be a reliable predictor of the outcomes once you open these images in Lightroom or Photoshop (Figure C5).

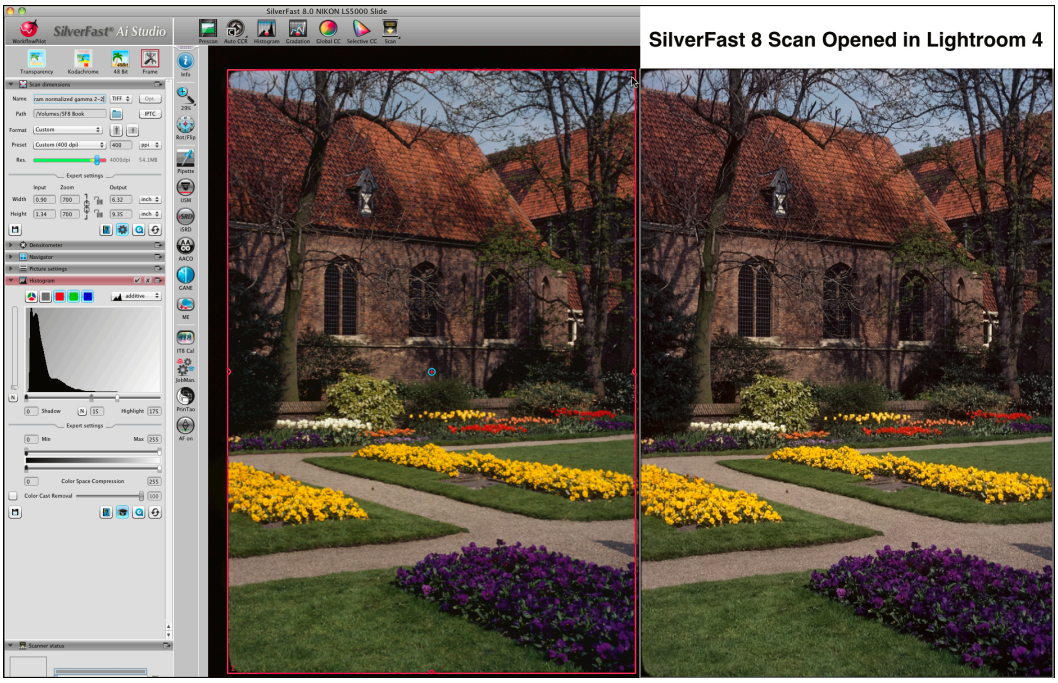


Figure C5. SF8 (left) and Lightroom 4 Versions Compared

If you hardly see any difference between them, that's the way it should be, because I'm using my custom scanner profile, with ProPhoto colour working space in both applications. The right-side image is the left-side image simply opened in Lightroom 4, with no tweaks whatsoever, except for normalizing the histogram in SF8 before scanning.

Finally, even after reading all of the above, if you are still one of those "doubting Thomases" wondering whether all this stuff about colour management and profiles matters, try mismatching an unprofiled scan with a profile that is not calculated for your scanner model. It's pretty simple. Make a completely unprofiled scan in SF8, open it in Photoshop, and select **Leave As Is (don't color manage)** when you get the **Missing Profile** warning. Then go to **Edit>Convert to Profile** and enable the **Preview** to see the effect on the image of selecting a profile that is not the one for your scanner, such as I did in Figure 3.37, far right. My scanner is a Nikon 5000 Super Coolscan ED, and when I selected instead the profile for a Nikon LS-2000, I got the rendition shown in the right-side image:

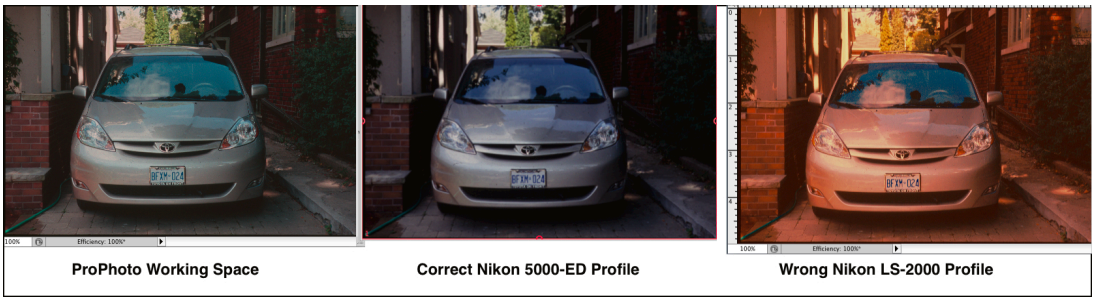


Figure 3.37 Why Colour Management Matters

Chapter Four
Loading and Formatting the Image

4.1 Loading and Image Format

In this chapter I cover how to load and format images for scanning. There are differences of approach, procedure and features between flatbed and dedicated film scanners. Flatbed scanners allow for batch processing (Chapter Eleven); this is also possible for those film scanners equipped with slide feeders or magazines. I discuss loading and formatting the image in the context of dedicated film scanners, showing differences for flatbeds. The sample film scanners I use in this book are the Plustek 7600i Ai, and Nikon Super Coolscan 5000ED models. The flatbed is the Epson Perfection V750 Pro. There are hundreds of scanner models on the market with varying features and operational details, which I cannot hope to cover, but similarity between them is great enough to make this sample useful to most readers.

Turn on the scanner and launch SF8 (I'm demonstrating from Ai Studio). The Start screen automatically recognizes which scanner is on. If you have more than one scanner supported by SF8 turned on at the same time, use the "Image Source" drop-down menu (Figure 4.1) in the "Welcome to SilverFast" screen to select your scanner. [I recommend having only one scanner turned on at a time, to avoid possible issues from multiple imaging devices being open and connected to the same USB card.] Then click **Start** (Figure 4.1, black arrow).

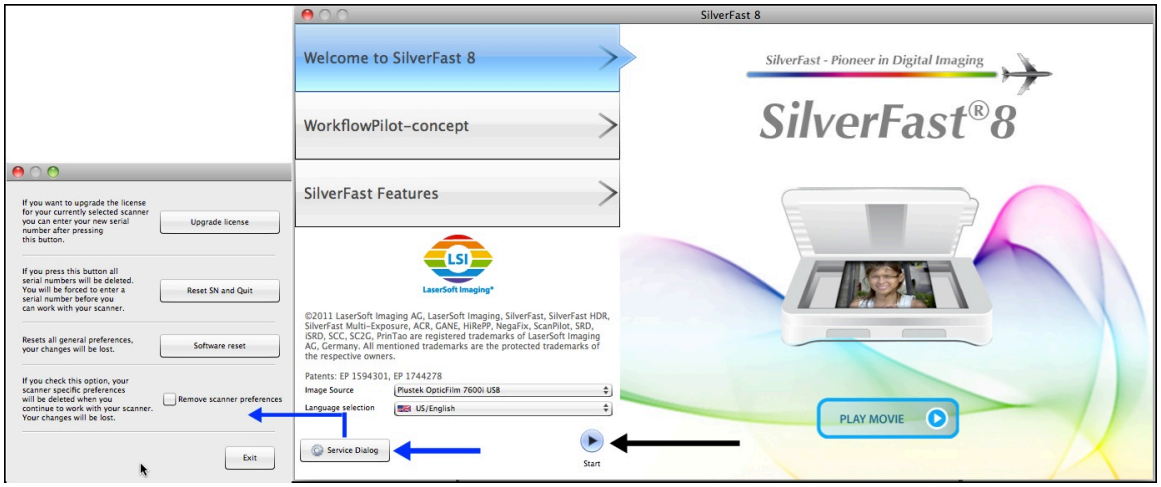


Figure 4.1 SF8 Start Screen and Service Dialog

[While at this screen, the service dialog in the lower left corner (blue arrows) provides for removing the preference files, resetting the software and/or the serial number and upgrading the license. Short of re-installing the application, resetting the software and the preferences are common remedies for software misbehaviour if all else fails to fix issues that could arise periodically.]

If it's a film scanner with a mechanized feed, load the film [often but not always – depends on the model - emulsion side down (shiny side up)] into it.

Mode and Scan Type: Next, decide whether you wish to work in **WorkflowPilot** mode, or in Manual mode, by clicking on the Workflow pilot button in the upper left corner of the interface (Figure 4.2). It toggles between cyan and red.

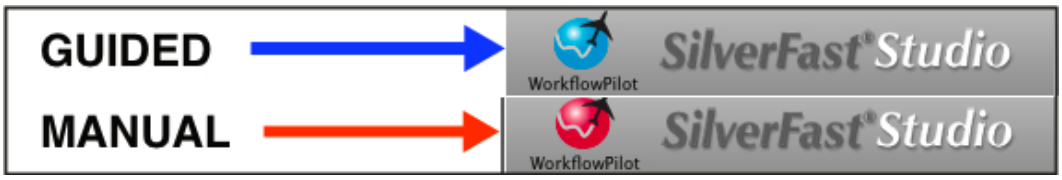


Figure 4.2 Choice of Workflow Mode: Guided or Manual

When the button is cyan you are in **WorkflowPilot** mode, which I walk-through in Chapter Ten; when it is red you are in Manual mode, which enables all of SilverFast's controls in the various settings and lets you work in any order you prefer (though there are some conditions on workflow order I mention where needed).

I demonstrate the formatting steps and choices in Manual mode, in order to cover all the options the application offers.

In the top row of the Dock, just under the SilverFast logo, there are four buttons for identifying the type of scan that will be done (Figure 4.3). Operate them in order from left to right, as I do here.

Figure 4.3 Scan Type Set-up Menu

First button: select whether the scan media is a **transparency or reflective**. This button will be inactive for film scanners, because SF8 knows they accept only transparencies; however it will be active for flatbed scanners accepting both transparent and reflective media.

Second button: If the first button is on **Transparency**, the second button gives you the choices of "**Positive", "Kodachrome", or "Negative**". Select the correct type of transparency here. Don't omit or make mistakes with this choice, because it affects everything henceforth and must be correct.

Third button: there are nine possible **bit-depth types** here (Figure 4.4).

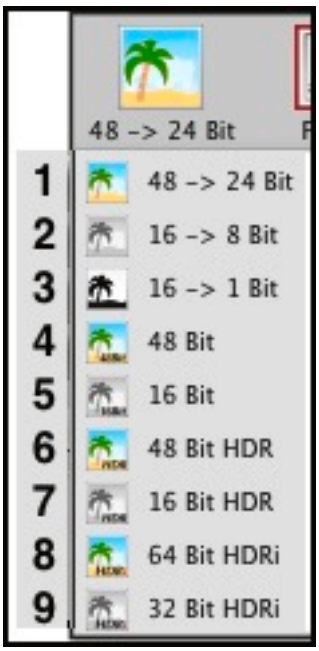


Figure 4.4. Colour Format Choices

These nine bit-depth types are organized in a hierarchy, which I've numbered to the left in Figure 4.4 for ease of reference to the following choices:

a) bit-depth for image editing in SF8's internal processing engine, followed by conversion to a lower bit depth for saving out of SF8: (modes 1, 2, 3);
b) high bit depth with no further conversion of bit depth: (modes 4, 5 for colour and grayscale respectively);
c) grayscale modes with fixed or reduced bit-depth (2, 3, 5);
d) HDR or no HDR; (modes 6, 7, 8, 9 are for HDR scans; modes 1, 2, 3, 4, 5 are not).

I describe below the meaning of each of these choices.

Bit Depth: The selected bit depth will "bake-in" a very important aspect of ultimate scan quality. Every pixel can contain one level of luminance. The finer the distinction of luminance levels between adjacent pixels that the scanner can produce, the smoother the tonal transitions will appear in the image. "Bit depth" is a term defining the number of levels of luminance (from black to white) any one of which a pixel can contain. The larger the number of these levels, the finer the luminance distinctions can be. The higher the bit-depth, the larger the number of luminance levels that can be reproduced. Especially with larger colour spaces, higher bit depth provides smoother tonal gradation and tonal transitions than possible with lower bit depth, thereby greatly diminishing the risk of seeing

discontinuities of tone where they are not expected[22]. High bit depth also allows more radical image editing without visible deterioration of image quality.

Bit depth may be quoted per colour channel or in aggregate for all three RGB channels. It is the latter convention in SF8. On a per channel basis, the choices are 16-bit (called "high-bit") and 8-bit (called "low-bit"). As an RGB image has three colour channels, (red, green and blue), 16-bit per channel RGB colour images are 48-bit images (3 channels * 16 bits each), and 8-bit per channel colour images are 24-bit images (3 channels * 8 bits each). 48-bit images use twice the storage space of 24 bit images. Only 24-bit images are allowed for JPEG and GIF files used for web and devices, while 48-bit images are much preferred in preparing an image for inkjet printing (because they are much richer in data, have superior tonal granularity and they handle image editing more robustly), regardless of whether the printer is capable of handling an 8-bit or a 16-bit data stream.

When the infrared channel is scanned, that channel is saved in 16-bit, making "RGB + infrared" into a 64-bit colour image (16 bits * 3 colour channels plus the infrared channel) or a 32-bit image (16 bits * 1 grayscale channel plus the infrared channel).

There is a choice in this menu to scan from 16-bit to 1-bit, also called a "line art scan", which may be useful for scanning drawings, hand sketches and line drawings (engineering, architectural, construction) in "black or white".

For the various bit depths**,** scans may be regular RGB colour scans, grayscale scans, or HDR scans. The regular RGB scans can be 48 bit or what is called "48>24 bit"; the latter means that while the image editing you do in SF8 is calculated in 48-bit to protect image quality, you will be getting a scan result preserving 8 bits per channel instead of 16 bits per channel. I recommend this mode when scanning photos that will be used only for web and devices. Otherwise stay with high bit depth.

Grayscale

The grayscale scans are the 16 bit or 16>8 bit Grayscale choices. These choices create a one channel, perfectly neutral Black and White image, in either 16-bit or 8-bit depth. However, the underlying colour channels remain available (until the image is saved out of SilverFast) for adjustment of luminosity by underlying colour group with the **SC2G** tool, as described in Chapter Nine.

HDR and HDRi

The HDR scan types (HDR, HDRi) are only available in 16-bit per channel for both colour and grayscale options. They allow you to make an unadjusted scan for archiving exactly what comes out of the scanner. The scan may be archived in a folder you designate, allowing you to open the image afterward in SilverFast HDR

[22] I provide a more detailed discussion of bit depth in Chapter Five.

and make fairly non-destructive, reversible image edits in that application, without needing to rescan the image, as described in Chapter Two on workflow alternatives.

Select 48-bit HDR if you do not wish to carry the infrared channel into the HDR scan. Select 64-bit HDRi if your scanner supports infrared and you do wish to carry the infrared channel into the HDR scan. I recommend the latter if feasible, because this enables you to use SilverFast's highly effective infrared dust and scratch removal tool (**iSRD**) once in SilverFast HDR. **iSRD** is not available in SF8 when you select HDRi mode – it is only available in SilverFast HDR.

Before moving rightward to the **Frame** tool, click on **Prescan** (Figure 4.5, red arrow), which will cause the scanner to make a prescan of the image and SF8 to provide a preview of the image in the image window.

Fourth button:

This is the "**Frame**" tool. The image frame shows differently depending on whether you are using a flatbed scanner or a film scanner. If you are using a **film scanner**, when you click **Prescan,** the whole image window will be filled with the current image lined-up in the scanner[23] for scanning and it will be surrounded by a red frame.

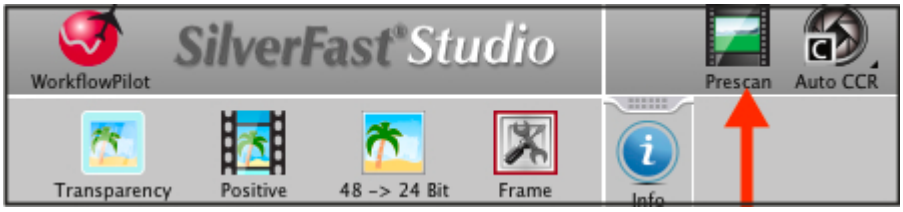


Figure 4.5 Prescan Command (above red arrow)

If you are scanning film in a **flatbed scanner**, make sure **Transparency** is selected in the first (left-side) menu icon (Transparency/reflective). In **Preferences>General>Hi-Res Prescan** select the magnification needed to be able to derive a sharp large-size prescan from each of the original individual images. This will avoid having to make the scanner repeat individual pre-scans for a sharp preview each time another image is selected. My testing indicates that for a single 35mm original to be displayed sharply at a size of about 6*9 inches, a setting of 6x is adequate; however, lower settings would be suitable at lower image preview magnifications. If the Hi-Res Prescan setting you selected is too low, when you trigger the pre-scan the SF8 magnification tool icon (in the tool column, Figure 4.9) will turn red; if the setting is satisfactory, it turns green.

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[23] Certain scanners with film strip feeders such as the Nikon Super Coolscan 5000ED may not line-up the image frame with the scanner frame exactly; to correct this, use the tool in SilverFast for frame alignment.

Still dealing with flatbed scanners, click **Prescan** (Figure 4.5, red arrow), and the whole of the scanner's slide or filmstrip holder with all the slides or filmstrips loaded into it will show in the image preview window (Figure 4.6, where I show just three slides from a holder of twelve, to save space).

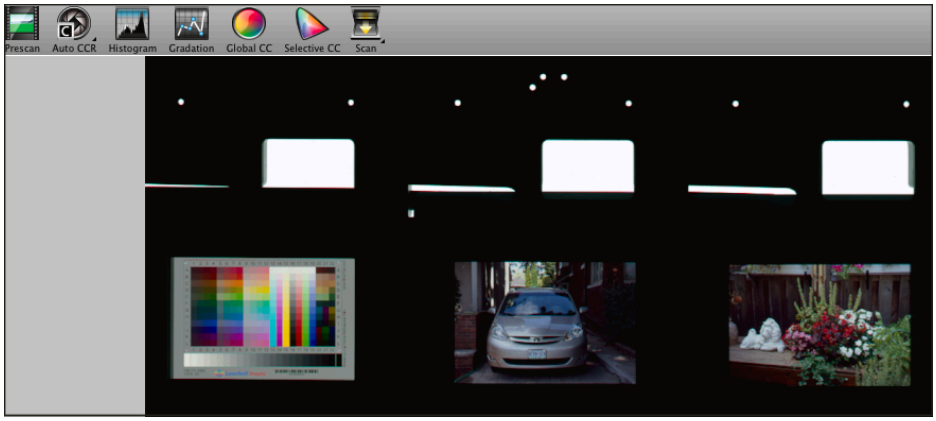


Figure 4.6 Prescan of Flatbed Slide Frame (Partial View)

Now SF8 has a very neat feature for finding the images in the frame-holder. Click on the **Frame** pull-down Menu (Figure 4.7), scroll to **Find Frames**, click on it and hover your cursor rightward to select the kind of media and holder you have on the scanner bed – in my case in this illustration, a **35mm slide holder** (Figure 4.7, red arrow).

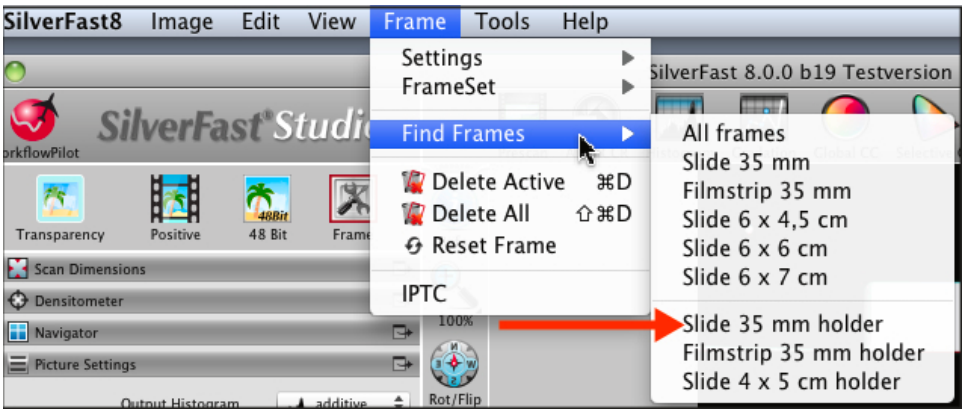


Figure 4.7 Frames Pull-down Menu

Release your mouse button; SF8 will take a moment to automatically place frames around each of your images in the holder (Figure 4.8), and it will select one of them (usually the last by default), the selection being identified by a red frame. More information on the use of **Frames** menu features is provided in Chapter One, Section 1.6.

Figure 4.8 Frames Found

Whichever framed image you click on, its frame will turn red and that becomes the selected image. Of course you want it to fill the preview window for working on it. To do that, click on the Magnifier (Figure 4.9 by the red arrow). If you have selected **Hi-Res Prescan** in **Preferences**, the scanner immediately fills the preview window with a sharp full-size prescan of the selected image. If you have not selected the **Hi-Res Prescan** in **Preferences**, when you click on the magnifier, the scanner will make a fresh high resolution pre-scan, which takes a bit of extra time.

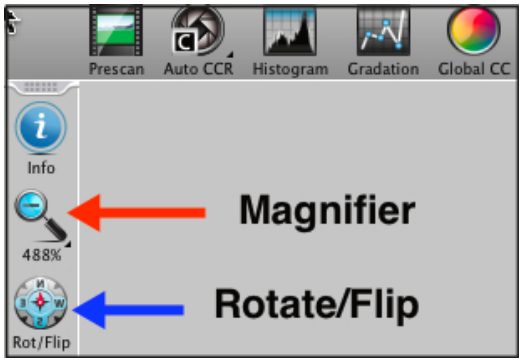


Figure 4.9 Magnify, Rotate, Flip

Click on the Magnifier again, and the preview window will return to include the whole of the scan frame. You can toggle back and forth by clicking on the Magnifier icon in the tool column.

Rotate/Flip: Different scanners require loading the media emulsion-side facing down or up. You may experiment with your scanner model to see which is correct by seeing which way produces a correctly oriented image in the preview window. However, in case the preview image is reversed or upside-down, or with the wrong orientation, you may click on the ”Rot/Flip” button below the Magnifier to fix it (Figure 4.9, blue arrow). When you click on this icon, a menu will pop-out with four choices for rotating and flipping the image (Figure 4.10). You activate any one of those choices by clicking on it, and the image will adjust accordingly.

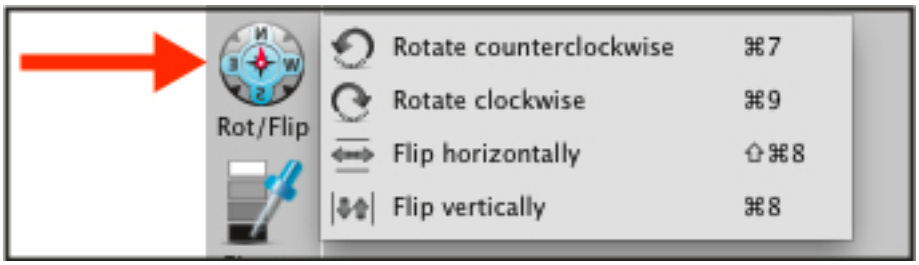


Figure 4.10 Rotate/Flip Options

Cropping: The very next step I recommend is that you do any cropping you wish by dragging the red image frame around the content you intend to preserve in the final image. Be careful not to exclude more than necessary, because you will be scanning-in only the material that remains within the red frame. You can always delete more later if you wish, but you won't be able to add anything back without rescanning. You can use the magnifying tool to zoom in for exact cropping and then click it again to zoom back out.

There are several reasons to perform the preliminary crop at the scan stage: firstly it reduces the eventual number of pixels and file size to retain only what you decide to keep; secondly, it affects exposure settings, because the range and shape of image luminance changes as a result of deleting image content. For example, if you've cropped-out a piece of the image that contains extreme highlights literally no longer "part of the picture", you've also eliminated a possible exposure adjustment problem of taming those highlights.

As well, suppose you cut out an area that contains a high concentration of very bright data or very dark tones; once they are cut out, the distribution of the luminance along the tone scale and the clipping point of the highlights can change.

I illustrate this in Figure 4.11. The upper version of the image, which includes all the patches in the target, has a tonal representation from black to very light gray, as shown in the histogram to the left of the target. The lower portion shows the impact on the tonal range and the histogram of retaining only a portion of the midtones – that is, I crop out everything except the centre rectangle enclosed in the heavy black frame (indicated by the red arrow). You'll notice that for this cropped image section, most of the tones are congregated about the center of the histogram (midtones), with a little spike near the dark-end, I suspect being bits of dirt on the slide. (You do the cropping by dragging the individual sides of the red frame as explained below in reference to Figure 4.13.) The histogram display and the tonality of the cropped section are of course consistent in the sense that you'll see no particularly dark or bright tones in the cropped segment.

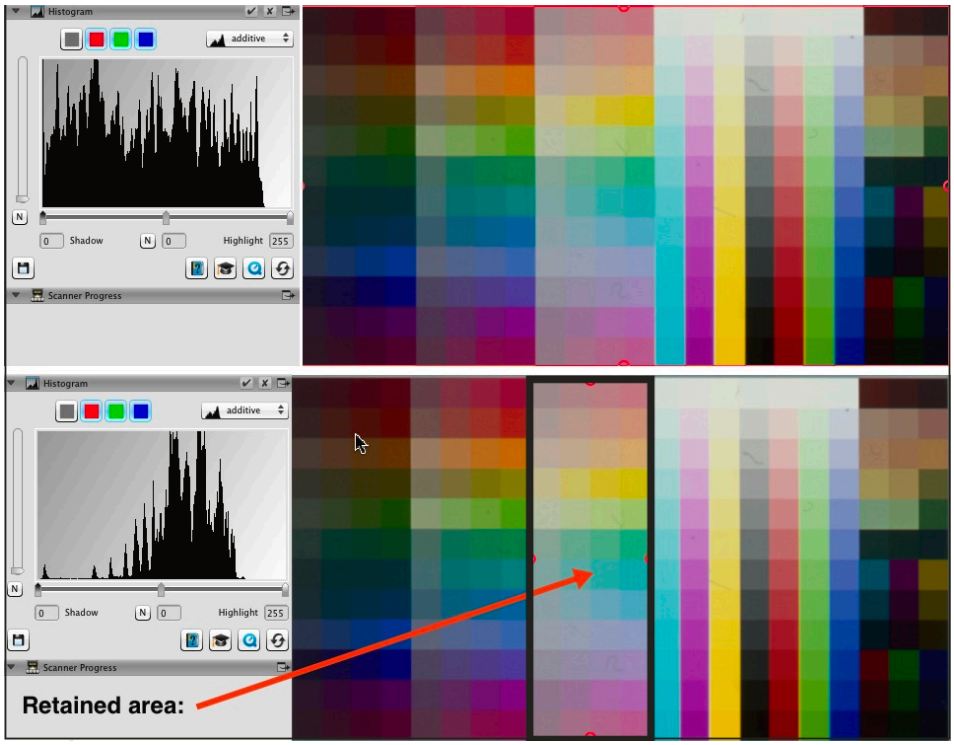


Figure 4.11 Impact of Cropping on Tonality

Thirdly, it helps you to concentrate any image edits you wish to make at the scan stage on the material you will be retaining, without the influence of extraneous material. For example, and anticipating the discussion in Chapter Seven, the kind of tonal edit I would perform on the histogram for the lower image is completely different than for the upper one. For the lower image, I would want to increase its contrast and vibrancy if this were a real, dull photograph of an interesting subject. All I need to do is pull-in the ends of the histogram, thereby increasing both contrast and saturation (Figure 4.12, red arrows, being careful not to eliminate tones to be retained at the bright and dark ends).

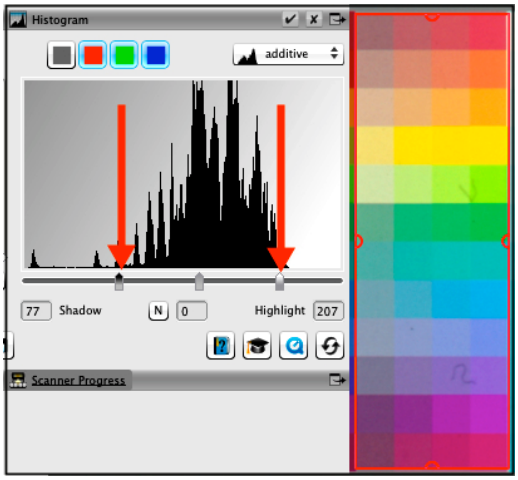


Figure 4.12 Edited Crop – (Compare with Figure 4.11 black-framed area)

To sum-up, not surprisingly, cropping affects other edits. If you are certain about the crop you want, crop first and do luminance and colour editing thereafter. I recommend that you have the image magnified to fill the preview window for exact cropping.

Once you've cropped the image, the input linear dimensions of the original media will have changed from their default values to reflect the cropped dimensions. I discuss image dimensions in Chapter Five, but first a few more words on using the frame to reposition the image.

The automatic framing I demonstrated above is usually a very good first approximation to the actual image area, but it may not be exact. Once you magnify the image to occupy the whole preview window, you can see what adjustments to the red framing may be necessary. If you need to drag the frame borders in or out, you can do this one border at a time (Figure 4.13, black arrow), by hovering your cursor over any point of the frame except the little semi-circles at the middle of each frame dimension. When the cursor turns to a two-way arrow, click and drag the red frame inward or outward as needed.

Figure 4.13 Control for Frame Resizing

The little semi-circles are for free-hand frame rotation. To do this, hover the cursor over one of those semi-circles on the mid-point of a frame dimension until it turns to a solid white hand **with no square hole in the middle**. Once you have the cursor in that mode, click and sweep your mouse around in the direction of rotation you want, as shown for a rightward rotation in Figure 4.14. Pressing the **SHIFT** key while doing this will snap the frame into straight alignment.

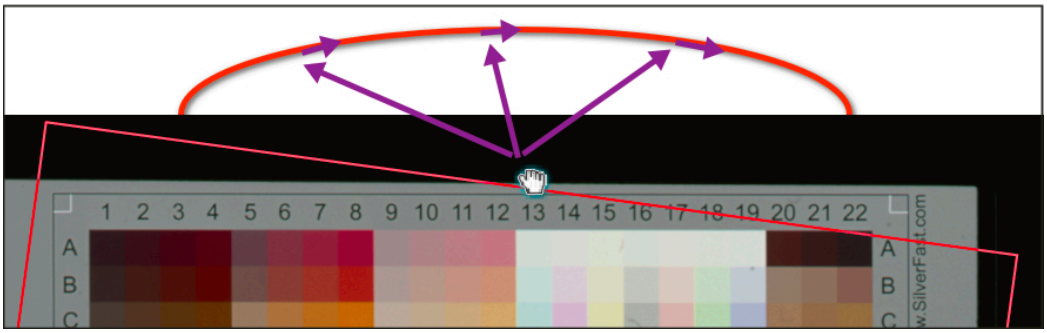


Figure 4.14 Control for Frame Rotation

If you wish to simply move the whole frame free hand, hover the cursor anywhere within the red frame (Figure 4.15). When the cursor becomes a hand with a square in the middle, click on it and drag to reposition the whole frame as you wish.

Figure 4.15 Cursor for Drag Frame Function

There are several additional features about frames I discuss in relation to the **Frames** pull-down menu at the top of the application interface (Figure 4.16). Please see Chapter One, section 1.6

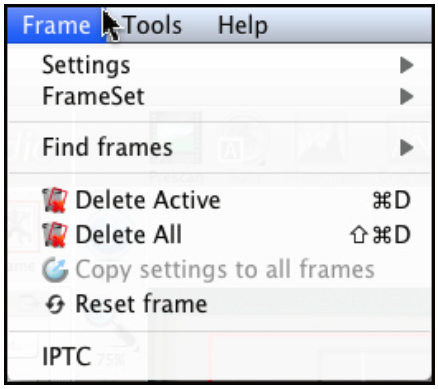


Figure 4.16 Frames Menu

Chapter Five
Bit Depth, Resolution, Print Dimensions and File Size

The four items in the chapter title are related, hence their inclusion within this chapter.

5.1 Bit Depth

I mentioned **bit depth** when discussing the choice of scan color mode in Chapter Four. Our purpose here is to provide a more detailed understanding of the concept and its importance to scan quality.

Every scan emerges as a matrix of millions of pixels – usually square. One pixel may contain only one colour and level of luminosity of that colour. We are accustomed to seeing smooth transitions between lighter and darker tones in our photographs. To retain these smooth tonal transitions, each pixel should be capable of rendering very small differences of tone between itself and its neighbouring pixels. Bit depth determines the extent of this capability.

The tonal range you see just below shows a generally preferred photographic property: smooth transition through *all the shades* of grey from black to white:

Figure 5.1 Gray Ramp

How do we get this in a digital image, which is a grid of little pixels ("picture elements"), each portraying a discrete level of light (tonality)?

Progression up the scale happens via many steps, small enough such that difference of gray tones between contiguous steps can be imperceptible, done as follows.

Pixels have a "bit depth" determining how many shades of grey (and colours) they can reproduce. Bit depth = 2 raised to the power of the depth. A pixel with bit depth of 1 (2^1) includes only black & white and is said to have 2 tonal *Levels* (the bit is "off" = 0, or "on" = 1):

Figure 5.2 Bit Depth 1

The higher the bit depth, the more shades of grey ("levels") the pixels can be, as the possible combinations of black and white information multiply exponentially, yielding many Levels of grey tonality from black to white.

$2^{\wedge 2}$ = 4 Levels of tonality (00, 01, 10, 11) = "4-bit" depth:

Figure 5.3 Four Levels of Tonality

$2^{\wedge 8}$ = 256 Levels (2*2*2*2*2*2*2*2) = "8-bit" depth;

$2^{\wedge 16}$ = 65,536 Levels = "16-bit" depth; a huge number of tones!

Clearly, with a grey scale chopped into 65,536 very tiny steps from Black to White, there is much less risk of abrupt transitions (banding, posterization) between steps compared with a scale chopped into 256 larger steps. The 256 Levels of 8-bit images often suffice for perception of adequate tonal continuity, but photographers aiming for highest image quality prefer "16-bit images".

Distinction between tonal range and bit depth:

Think of the tonal range as a staircase* from Black to White, the deeper the black relative to white the greater the "dynamic range" (ratio of B/W). Bit depth determines the size and number of steps within that range: within the same range, higher bit depth means more and smaller steps, hence smoother tonality.

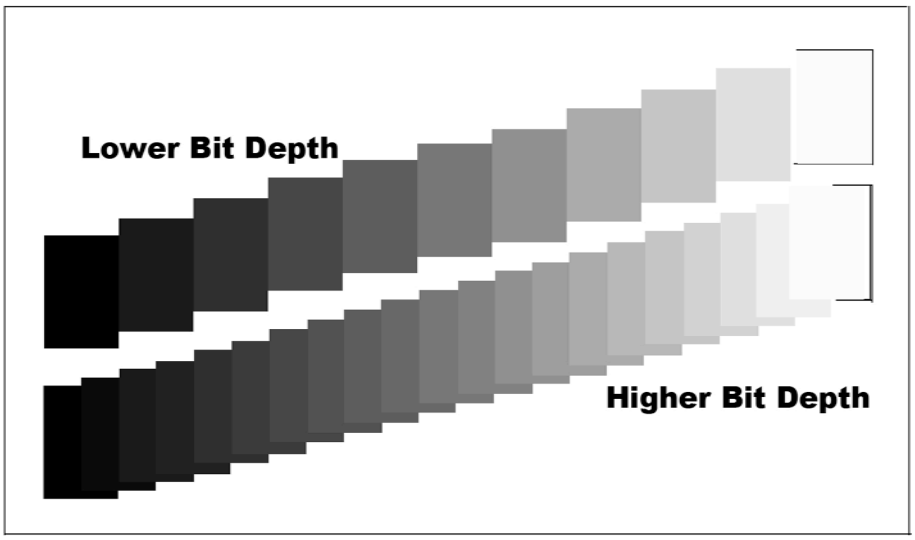


Figure 5.4 Tonal Range and Bit Depth

(*Jeff Schewe's analogy, from "Real World Camera Raw with Adobe Photoshop CS3")

Each of the three colour channels in a scan carries the selected luminosity range, resulting in an image file capable of portraying over 281 trillion colours. This vastly exceeds human capability to distinguish between colours, but that's not the important point.

The important point is that within each channel, there are enough small steps in the luminosity range such that image edits which destroy a certain number of these steps (for example, by remapping darker shades into lighter ones when we brighten a scan) will have no visible impact on the smoothness of transitions. For this reason, I recommend using 48-bit as the choice scan type. As well, now that an increasing number of inkjet printers are 16-bit per channel capable, preserving 16-bit throughout the process from scan to print provides robust protection of tonality.

This recommendation does not carry to JPEG and web-ready images, which are only 8-bit capable, hence the option in SF8 to select a scan type starting the image in 48-bit, but then downsizing it to 24-bit at the stage when it is exported from SF8. I only recommend you do this if the image will never be destined for print.

5.2 Resolution

Recalling that scanning digitizes the image into millions of pixels, in order to retain photographic appearance, we never wish to see these pixels (unless creating special effects involving the visibility of pixels).

Resolution is about detail we can discern. What we can discern depends on focus and acuity, the latter otherwise known as "edge contrast". If the scanner lens were inferior or unfocused and the image blurred, the rest of this discussion is moot, because detail won't be properly distinguished no matter what we do about acuity. So we're assuming that the photo and the scanner are focused; hence, the remainder of this discussion is about acuity – without which we also wouldn't distinguish detail. Two squares joined side by side of identical colour and brightness look like one rectangle. Change the brightness of one just a little and we discern two squares. In Figure 5.5 the left panel is two squares of the same luminance and hue. The right panel is the same, except that the right-most square has a five percentage-point boost of luminance. A small colour change would also distinguish it.

Figure 5.5 Pixel Distinctions

Resolution is higher the more shades of luminance and colour we can distinguish within a given surface area. One pixel can contain only one hue and luminance value. The larger the number of pixels crammed into an inch of image dimension, the

smaller the individual pixels and the larger the number of differing shades of luminance and hue per square inch available to discern, hence the better the rendering of high-frequency image detail. And the more pixels per inch, the less discontinuous may be the transition of light and colour between them, improving the prospects for smooth tonal and colour transitions that are the hallmark of most high quality photography.

Resolution in this context has only one meaning: the number of pixels per inch. Smaller pixels within a given surface area means more pixels per inch (PPI) and higher resolution, while larger pixels within a given surface area means fewer PPI and lower resolution.

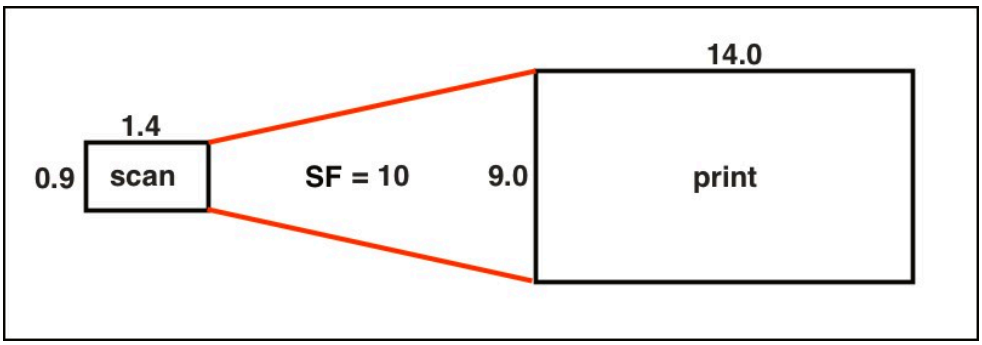
The scanning industry erroneously comingles "dots per inch (dpi)" with PPI. Scanners do not scan dots; scanners and scan software create pixels from scan samples in performing the analog to digital conversion. Printers spray droplets of ink known as dots. Hence the misnomer "dpi" comes from the printing industry. The concept is even inappropriate for the printing industry nowadays, given the complexity of the screening and dithering algorithms for laying droplets of ink on paper. Nonetheless, SilverFast preserves this acronym in some places on the interface, because it is a scanning industry convention; however, to be technically correct, when talking about resolution in this book, I talk about PPI, and simply note that it means the same thing as "dpi" wherever you may notice it in the SilverFast interface.

Now, how many PPI should your scanned image contain? As usual, "it depends……", in this case on the destination of the photo. Even the high-resolution professional photographic monitors now on the market have a resolution seldom exceeding 110 PPI. The convention used by various applications sizing photos for the Internet and devices is 72 PPI. Therefore, if you are certain that your scans will never be used for anything but internet and devices, an output resolution, of anything between 72PPI and 110PPI will be satisfactory. In fact, this resolution should not be exceeded, because the Internet and hand-held devices require small file sizes, and file size increases exponentially with increasing PPI.

Scanning images for print is a different matter. Here, the general guidance is to send no less than 240 PPI and no more than 720 PPI to an inkjet printer. Below the lower bound, visible image quality begins to suffer, and above the upper bound, any increase of resolution would not be visible. In fact, anything above 360 PPI would not likely be visible, and beyond a certain point image quality could be degraded by the printer driver throwing away information it cannot use. Because people look at smaller prints at closer range and larger prints from farther range, the general recommendation is to use higher resolution for smaller size photos and the lower resolution for larger photos. These guidelines are directly relevant to the OUTPUT resolution at which you should scan your media.

So far I've been talking about "output resolution", which means the resolution contained in the final product, be it a scan for a print or for web viewing. These final products are most often much larger (in respect of their linear dimensions) than the media being scanned, especially if the media were 35mm positives or negatives. The difference between the two is defined in terms of a **scaling factor**, I hereafter refer to as **SF**. It is: **output dimension/scan media dimension**. The resolution of the scan media is named in the SF8 interface as **input** resolution.

I illustrate with an example.



A 35mm slide is 24mm by 36mm, equivalent to 0.95 inches by 1.42 inches. To keep it simple let us assume the media to be scanned is cropped to 0.9*1.4 inches. Let us further assume the intended final output is a print, to be 9*14 inches. Hence, the scaling factor (**SF)** is 14/1.4, or 10, or 1000%.

Let us assume you want the output resolution to be 300 PPI for printing. Because the linear output is 10x the linear input, the scan media, or input, resolution must be 10x the output resolution, in order to achieve the output resolution at an **SF** of 10; hence the scan input resolution must be (300*10) = 3000 PPI. Generally:

Scan input resolution = (output resolution * **SF**).

This can also be understood in another way. Focusing on the long dimension, 14 inches, the **total number of pixels** needed for the **output** is 300 PPI * 14 inches, or 4200 total pixels. The long dimension of the media being scanned is only 1.4 inches. Therefore, to get 4200 pixels from a 1.4 inch length of media to be scanned, the **Scan PPI** needs to be 4200 pixels/1.4 inches = 3000 scan PPI. In more general terms:

Scan input resolution = total output pixels / length of media to be scanned.

Then the question is whether your scanner is capable of scanning the number of PPI required for your desired output specifications. Here the waters get a bit muddied, because there are several concepts of scanner resolution: optical resolution, interpolated resolution and the scanner's actual resolving power.

To dispense with the last one first, the actual resolving power of the scanner – meaning the extent of distinguishable detail it can reproduce from the media, needs to be measured with a bespoke target, such as LSI's **USAF 1951** target, available from LSI. It is most often the case that scanners rarely distinguish the extent of detail implied by their stated optical or interpolated resolution. But that is a different definition of resolution from the arithmetic or mechanical one I am using here. I revert to this subject in **Addendum 1** to this chapter.

The limit of scanner optical resolution is the maximum number of PPI the scanner can reproduce based on the array of its sensor; the manufacturer gives this number. Hence, referring to the example above, if your scanner had an optical resolution of at least 3000 PPI, the desired output would be achievable within the scanner's optical resolution.

Manufacturers also refer to a maximum resolution that is not optical alone, but includes mathematical algorithms developed to boost the resolution, essentially by inventing information from interpolating pixels. SF8's application parameters for dealing with resolution are based on optical resolution. SF8 normally "tops out" at twice the optical resolution of the scanner, because beyond that amount, image quality is likely to show signs of deterioration.

Now, to make life a little more interesting, scanners do not necessarily scan at exactly the input resolution you may happen to have ordered-up as a result of your output settings. In SF8 you select resolution based on the OUTPUT resolution you want (in my example above, 300 PPI). Scanners scan at discrete INPUT or scan resolution steps, which differ from one model to another.

So referring to the example above where you need a scan resolution of 3000 PPI, let us assume you own a scanner with the following resolution steps in the vicinity of your input requirement: 2500; 2800; 3100. In such cases, SF8 is programmed to scan at the higher resolution, and then downsize the resolution to that required. So in this case it would scan at 3100 and then downsize to 3000, by resampling pixels in order to shed the extra 100 PPI. Given a choice between upsampling and downsampling, LSI's research confirms the latter better preserves image quality.

There is a history of lively debate about how to manage scan and output resolution between the scanner and, say, Photoshop, when setting the output and scan resolutions for the scan. One argument is that one should always scan at the scanner's maximum optical resolution and then downsize to the resolution one needs in the external editor (e.g. Photoshop). Another argument is that one should "right-size" the resolution at the scan stage, using the maximum output resolution and dimensions one thinks one will ever need, because it may save on file size and the quality differences are, within limits, pretty much indistinguishable on paper or in viewing devices. I explore this set of issues in **Addendum 2** to this Chapter. As usual, the answer is not quite as simple as one would wish.

5.3 File Formats:

The Scan Dimensions panel (Figure 5.6) allows you to select five file types:
JPEG: A compressed file format for web and devices; sheds data for compression.
JPEG 2000: A JPEG-type format allowing compression without data loss.
TIFF: An open format for multi-purpose digital imaging and printing.
PSD: Photoshop's native image file format for use in Photoshop and printing.
PDF: Portable Document Format (for scans to be opened in a PDF reader such as Adobe Acrobat).

I normally recommend using the TIFF format, as it is a multi-purpose, industry standard format. JPEGs can be made from it as needed.

5.4 Scan Dimensions Step-by-Step:

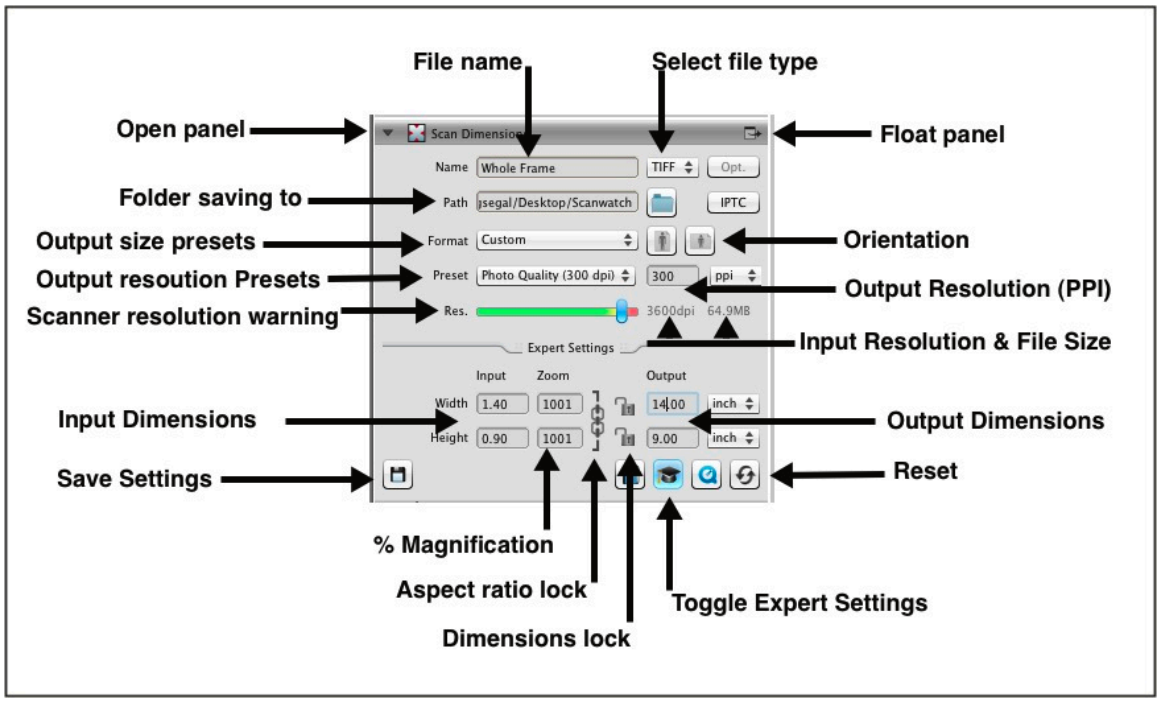


Figure 5.6 Scan Dimensions Panel

1. Click the little triangle on the top left side of "Scan Dimension", which opens the Scan Dimension dialog.
2. Click on the third button from the right at the bottom of the dialog – the one with the blue icon - to expand the dialog to "Expert" mode. (Yes, you'll be an Expert once we're done with this!)
3. In the top pane, type in the name you wish to give the file.
4. In the dropdown box right next to it, select the file format you want (the choices are TIFF, PSD, PDF, JPEG and JPEG 2000). I recommend TIFF or PSD for images destined to print, and JPEG for web and devices. JPEG2000 is a

lossless[24] JPEG format. If you aren't sure of the final output purpose, I recommend you select TIFF. You can always make JPEGs from TIFFS later.

5. If you select JPEG or JPEG2000, click on the "Options" button immediately to the right. Here you should select the JPEG image quality you want. Higher quality is achieved by less compression. The higher the quality, the larger the file will be. The High setting in the vicinity of 80% would be satisfactory for most purposes using the JPEG format.
6. If you select JPEG2000, clicking on the same "Options" button will give you the same quality choice, and also the choice of whether to make the compression "Lossy" or "Lossless". As the primary purpose of JPEG2000 is to enable lossless compression, this would be a sensible choice for this format.
7. In the second row, click on the button with the folder icon and select the destination folder on your hard-drive for the scanned image. It will pull-up your **Pictures** folder, but you can select any other. When selected, click **Choose**.
8. Moving on to the **Format** dropdown pane (the third row), click on one of the arrows. Preset output dimension choices will open. If one of the output presets is correct for your needs, click it. If not, click **Custom**.
9. To the right of that pane, click on the left button for Portrait orientation and on the right button for Landscape orientation.
10. For the fourth row, **Preset**, this is where you select output resolution. Click on one of the arrows in the dropdown pane to see whether one of the resolution presets is OK for your needs. If so, click on it. If not, enter the PPI you want in the box immediately to the right of this pane, making sure that **ppi** is the chosen metric. In the next box to the right, you can chose to work in **lpcm** if you wish (the other available metric), but then select the resolution value accordingly.
11. Having done this, pay no attention for now to the **Res** slider (bottom row just above the **Expert settings**). I'll get back to it.
12. Make sure the **Expert settings** are toggled open for the next steps.
13. The first column from the left shows the dimensions of the input (scan) media, which you need not touch;
14. The second column, called **Zoom** shows the scaling factor, which you may adjust for setting your output dimensions (but need not – you can do this in Step 18);
15. The chain link to the right of this column is for locking or unlocking the aspect ratio (proportionality between width and height); to maintain proportionality keep this locked by clicking on it till the upper and lower brackets show. If you want it unlocked, click on the icon till the brackets no longer show (Figure 5.7).

[24] "Lossless" means that this is a file format for which compression does not cause loss of image pixels. Beware - not all devices or software can handle this format.

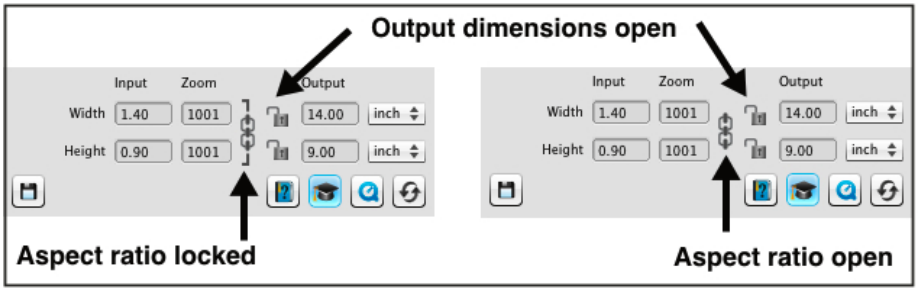


Figure 5.7 Aspect Ratio and Dimensions Locks

16. The locks in the next column are for locking or unlocking the individual width and height **OUTPUT** settings in the next column. You need to leave them unlocked for entering information in the boxes. Clicking on them toggles them locked or unlocked (Figure 5.7).
17. Select the metric you are using from the dropdowns in the last column.
18. In the **Output** dimensions boxes, with the aspect ratio (relationship of width to height) locked (Figure 5.7, left) and both output dimension locks open, type-in the size of one of the two linear dimensions you want; the other will set automatically. If you do not have the aspect ratio locked, you must type-in both the width and height in the provided boxes. Back to Step 9, make sure the width is the smaller dimension if you selected Portrait, or the larger dimension if you selected Landscape. If your image is square it doesn't matter.
19. Now look at the **Res.** row. It is for information purposes – nothing you need to enter, and tells you three things worth knowing: (i) whether you are approaching the limit of your scanner's optical resolution (movement of the slider toward red on the bar graph), (ii) the input resolution at which the scanner will operate to give you the output dimensions and output resolution you dialed-in, and (iii) the resulting file size, based on the formula I explain below.
20. If you wish to save these settings, do so now using the **Save Frame Settings** command located in the **Frame** menu of Figure 4.16. You are now finished in this panel.

A word of advice for selecting resolution and output dimensions for prints: scan for the largest linear dimensions you think you will EVER make this photograph in the future at an OUTPUT PPI value suitable for printing. If there is a difference between the dimensions you want now and those you may think you'll want in the future, technical outcomes for both will be better if you scan for the largest size you expect to print.

Some people want to know the file sizes emerging from all the foregoing choices. The higher the bit depth, the higher the resolution and the larger the image dimensions, the larger the file size. While storage is inexpensive these days, there is no point radically over-dimensioning image files, as this adds time to scanning and to working with them in external editors. While advice abounds to always scan for

the maximum optical resolution of the scanner, it makes sense to "right-size" the images, taking into account possible future use; but please see the **Addendum** at the end of this chapter.

While you can read the file size directly from the **Scan Dimensions** interface in SF8 to the right of the "Res." slider, **only if you really want to know,** I show the way it is calculated here.

Calculation of Image Dimensions to File Size

MB file size = PPI^2 * (W*H) * (b/8) / 1024^2

Where:

PPI = Pixels per Inch Output Resolution
W= width of output file in inches
H = height of output file in inches
b = sum of bit depth of all channels
MB = megabytes

Example:

Scanning a three channel (RGB) 35mm negative or positive in 16 bit depth to have output dimensions of 16.5 by 11 inches at 360 PPI on output:

$$MB = 300^2 * (14 * 9) * (48/8) / 1024^2 = 64.9 \text{ MB}$$

These numbers correspond with the dimensions and file size in Figure 5.7

Explanation: Squaring 300 provides the pixels per square inch. **W*H** provides the number of square inches. Multiplying **PPI^2** by square inches provides the total number of pixels. The pixels have bit depth. For an image being scanned as three channels each at 16-bit depth, the total bit depth per pixel of all three channels is 48. Because we are aiming for bytes and there are 8 bits to a byte, divide 48 by 8 to derive the equivalent bytes. Divide all of this by 1024 to convert to kilobytes from all the bytes, and divide again by 1024 to convert from kilobytes to megabytes.

You will see that if you apply these exact dimensions to an image in SF8, it will return a file size equal to this result, and the file size reported on your hard-drive for this image will be close, but not identical, as other data accompanies saved files on the computer hard-drive.

Addendum 1
Stated versus Measured Scanner Resolution

I return to the question of how the scanner's actual resolving power compares with the manufacturer's stated resolution based on the sensor specifications. I've tested this using the SilverFast USAF target for four scanners: the Nikon Super Coolscan 5000ED, the Plustek OpticFilm 7600i, the Epson Perfection V750 Pro and, with the help of an owner - the Imacon 343.

The target (Figure 5.8) is used by scanning it at the optical resolution of the scanner, opening it in an external editor, such as Photoshop, magnifying the image to 100% and looking for the cluster of horizontal and vertical bars at which separation between the black and white lines becomes indistinct. Each cluster has an **Element** number within a **Group**. The last distinct cluster defines the measured resolution. The measurement is taken from a table of resolution numbers for each **Element** within each **Group**.

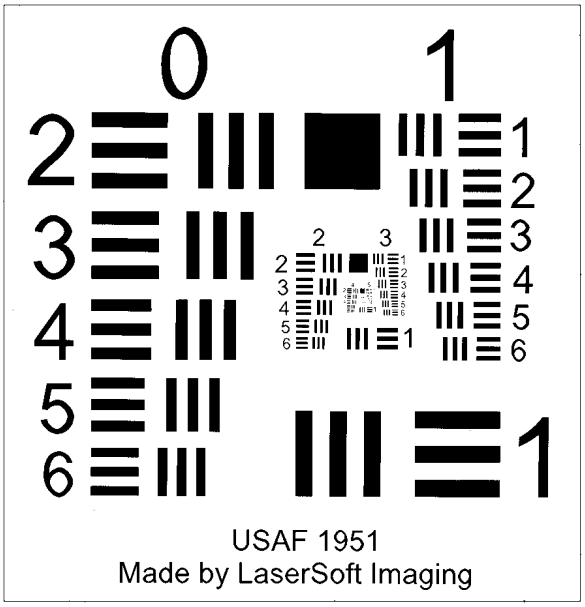


Figure 5.8 Scanner Resolution Test Target

The table below shows the outcomes for the four scanners:

Scanner Model	Optical PPI	Measured Resolution
Epson V750 Pro	6400	2299
Nikon 5000ED	4000	2896
Plustek 7600i	7200	2896
Imacon 343	3200	2896

Measured outcomes, seen on a high-resolution display, are well below the stated optical resolution for three of them. But, when you scan high-frequency real photographs at the same resolution in all four of these scanners, and print the

photos up to Super A3 size (13*19 inches), the differences of noticeable detail don't quite reflect what the numbers show; the ranking, based on blind tests with a number of observers is clearly Nikon, Plustek, Epson in decreasing order of apparent sharpness and detail. (For logistic reasons, it was not feasible to scan and print the same image using the Imacon scanner; hence the Imacon is not part of the blind test). The Nikon scan appears crisper than that from the Plustek, regardless that the readings taken from the bar chart are the same. That said, the relative outcome for the Plustek scanner is remarkable given its low price.

Addendum 2, overleaf, on Scanner Resolution, Image Resolution and Photo Quality is one of those **only if you really want to know** optional discussions.

Addendum 2
Scanner Resolution, Image Resolution and Photo Quality

The purpose of this Addendum is to explore the image quality (IQ) implications of different approaches to setting scanner resolution and final output resolution. The basic choices are to scan at maximum optical resolution of the scanner, or scan at the highest resolution and largest dimensions you think you will ever need, assuming there is a difference between the two options.

To understand the remainder of this demonstration, you need to know the difference between resizing and resampling an image. When you **resize** the image, you change the output PPI **or** the linear dimensions (they are arithmetically inversely related) without changing the total pixel count ("Pixel Dimensions") in the image file. You do this by leaving the **Resample** box **UN**checked in Photoshop's Image Size dialog Figure 5A.1).

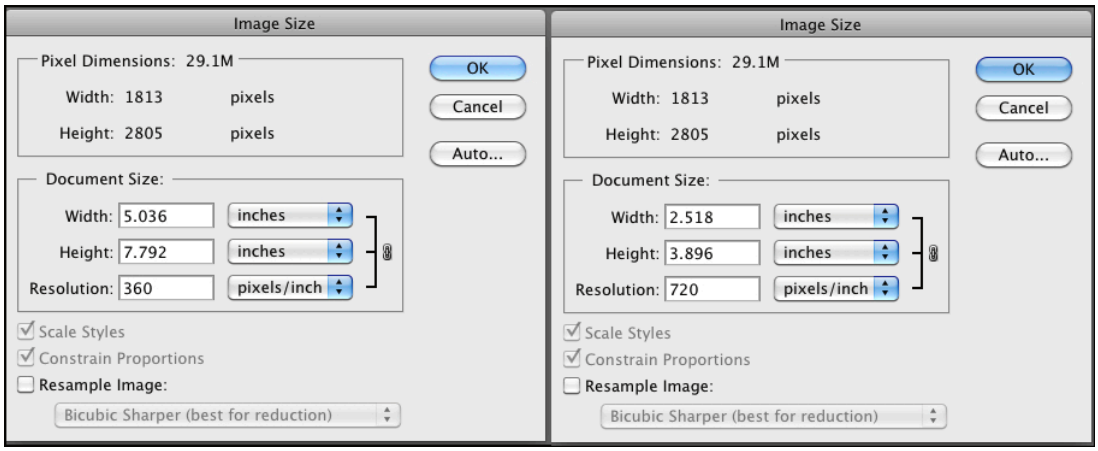


Figure 5A.1 Resizing without Resampling in Photoshop

In the left panel, the image contains 360 PPI and linear dimensions of about 7.8 * 5 inches. In the right panel, leaving the **Resample** option **UN**checked, I doubled the resolution to 720 PPI. The linear dimensions halved to 3.9 * 2.5 inches, and the total pixel dimensions remained the same at 29.1 million (see the information at the top left of the **OK** button). Resizing an image in this way does not create or destroy data.

Now, let us say we wanted to maintain the same 7.8*5.0 inch linear dimensions we had at 360 PPI, but in this case at 720 PPI. Here you **DO** check the **Resample** box, and Photoshop creates the extra pixels needed to maintain those linear dimensions at the higher resolution (Figure 5A.2).

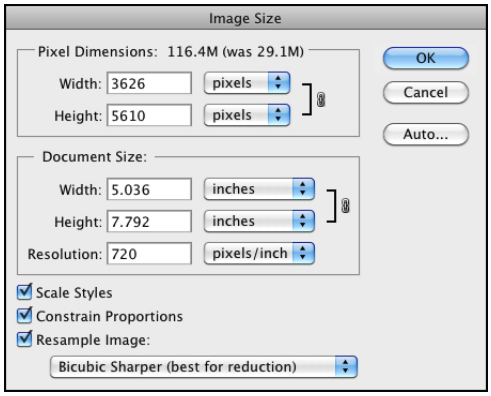


Figure 5A.2 Resampling in Photoshop

The pixel dimensions have increased to 116.4 million. Information has been created, and it could affect image appearance, especially at larger photo sizes.

The test image I'm using here is a shot taken on 100 ISO colour negative film at Wat Arun in Bangkok, 2003. The image is dirty, has vignettes and some grain, but all that is OK for what I'm doing. Grain and dirt help tell the story and the vignettes are immaterial. I use this shot because it is has good focus at infinity, there is much fine image detail on the face of the building and the surrounding sky reveals grain and dirt. (Sometimes, undesirable stuff can be helpful!)

Figure 5A.3 Test Image for Resolution

The red and blue boxes show the areas I examined, and reproduce in the Figures below at 100% display magnification, which matches one image pixel to one display pixel. Hence, I am pulling-up a relatively small piece of a 1.3 inch by 0.9 inch original photo and magnifying it greatly to visually appreciate comparative resolution at different image dimension settings between the scanner and Photoshop.

The first test I conducted is to determine whether it makes a difference if **resizing** (no resampling) a photo scanned at the optical resolution of the scanner (4000PPI – Nikon Super Coolscan 5000ED) were done in SilverFast or in Photoshop (Figure 5A.4).

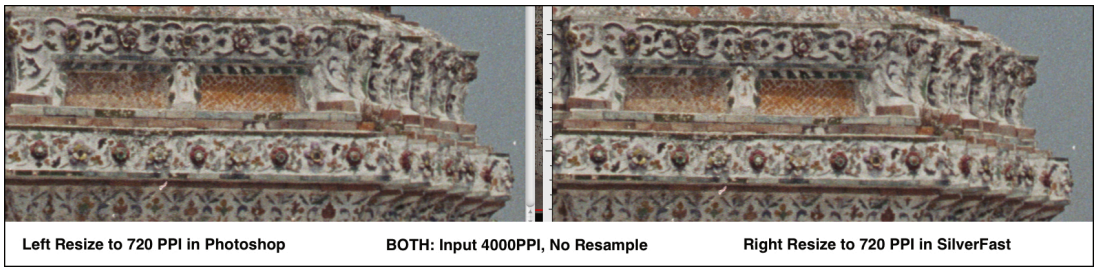


Figure 5A.4 Resize in Photoshop (left) versus SilverFast (right)

The image area in Figure 5A.4 is the one contained in the red box of Figure 5A.3. The procedures to produce the scans are as follows:

For the left side, the negative was scanned at the optical resolution of the scanner at 1.0 (or 100%) **SF,** (i.e. no scaling factor). The file was then opened in Photoshop and resized from 4000PPI to 720 PPI (the native resolution of an Epson 4900 printer set to "Finest Detail"). That produced an image of 7.8*5 inches at 720 PPI.

For the right side, the negative was scanned at the same 4000PPI scan (input) resolution, but resized in SilverFast to the same 720 PPI.

Whether looked at on a print under a loupe, or heavily magnified on a high-resolution display directly from this sheet, there is no perceptible difference of resolution whether the file is resized in Photoshop or in SilverFast. Look especially at the small mosaic tiles in the right-hand portion of the recessed gold/orange tile work.

For the next two tests, things get a bit intricate, so please follow carefully. The main issue being addressed in the next tests is the following: we want linear dimensions of 7.8*5 inches, and we only need ~360PPI resolution for printing. So, the question is: do we get better apparent resolution scanning at 4000 PPI and then resampling to 360 in Photoshop, or "right-sizing" the scan in SilverFast by setting the output resolution to 360 PPI with 7.8 inch * 5.0 inch dimensions.

There is a wrinkle to answering this question. Recall from the previous discussion in this chapter, the **input** resolution needed to make a scan of this size is the **output** resolution times the scaling factor (**SF)**. In this case the **SF** is about 556% (5.56) (Figure 5A.5).

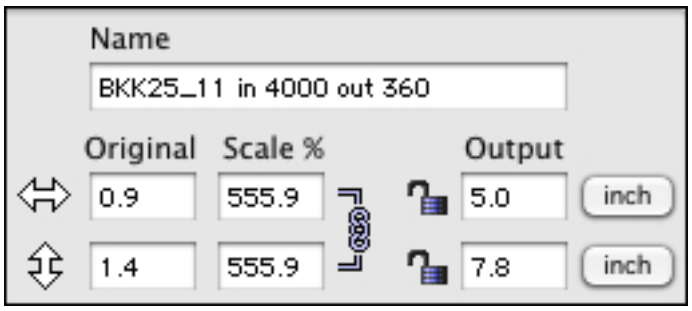


Figure 5A.5 Scaling Factor

At 360PPI and 5.56 **SF**, the input resolution needed for this scan would be 2001.6 PPI. But scanners don't scan at such refined values. They scan at discreet steps of resolution, in the case of this Nikon scanner, for example, being 666, 1000, 2000 and 4000PPI, the last being the optical resolution of the scanner I've just examined above. Remember I said that if the required input resolution falls between two of these steps, SilverFast scans at the higher resolution, and then resamples the image down to the requested dimensions.

Well, this is a real borderline case, where left at 360PPI, the scanner would scan at 4000PPI and resample down to 2001.6 to deliver the requested dimensions of **SF** 5.56 at 360 PPI. I could force it to scan at 2000PPI by simply changing the output resolution to 359PPI. This saves storage space. But what does it do to apparent resolution?

This situation suggests two tests for addressing the downsampling question:

(1) within SilverFast itself, what's the difference between scanning 4000PPI input resolution and 360PPI output resolution, versus 2000PPI input resolution and 359 output resolution? No resampling is done in Photoshop.

(2) What's the difference between scanning in 4000 PPI in SilverFast and resampling down to 359 PPI in Photoshop, versus scanning in 2000PPI at 359 output resolution in SilverFast and not doing any resampling in Photoshop?

Figure 5A.6 shows the results of test (1):

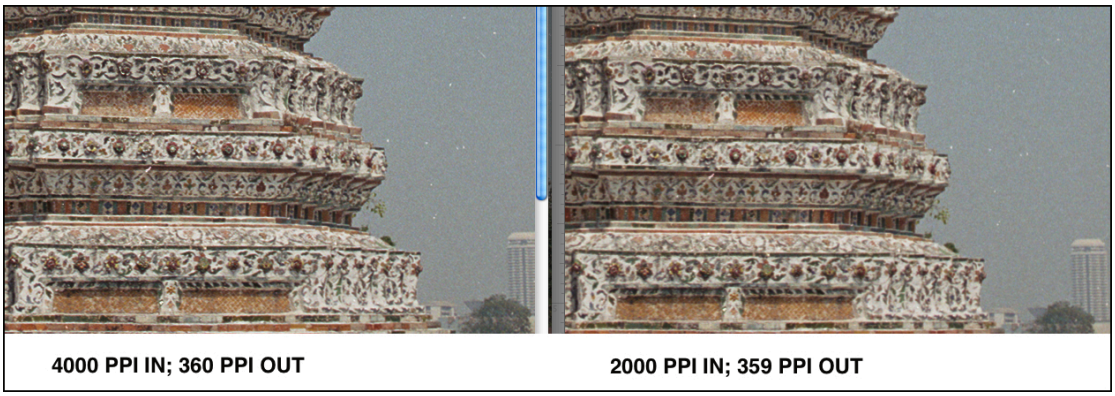


Figure 5A.6 Resampling Options within SilverFast

The sampled area for Figures 5A.6 (and 5A.7) is that contained in the blue box of Figure 5A.3. The evidence of this comparison shows a VERY SLIGHT margin of preference for the left side-image, scanned at maximum optical resolution; but I hasten to add that at normal viewing distance for an enlargement of the complete photograph, such differences are not visible.

Figure 5A.7 shows the results of test (2):

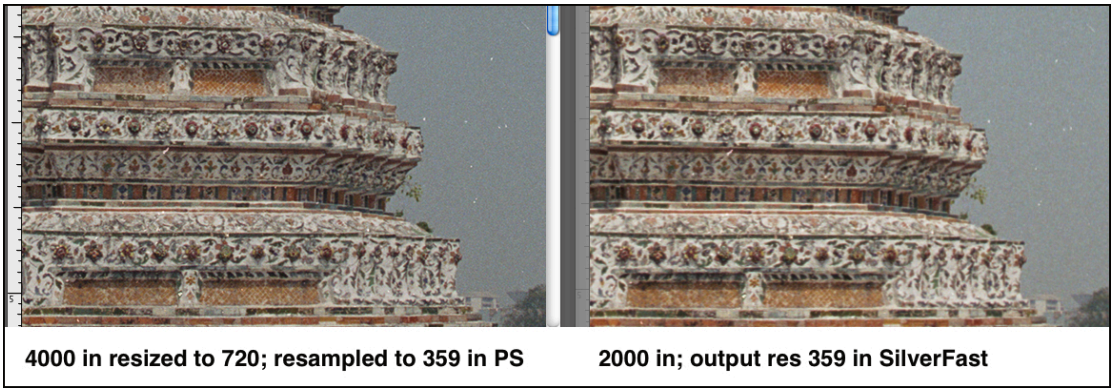


Figure 5A.7 Resampling in Photoshop versus in SilverFast

The left-side image was scanned at 4000PPI input resolution, MR = 1.0 in SilverFast, opened in Photoshop, resized to 720 PPI (giving it the 7.8 by 5.0 inch linear dimensions), then resampled to 359PPI. The right-side image was scanned in SilverFast at 2000PPI input resolution and 359 PPI output resolution at the same linear dimensions as the left side image. As both have the same linear dimensions and the same output resolution, pixel dimensions between the two are the same.

Magnifying these results, the left-side result is a bit "tighter" than the right. This is visible both in the tile detail and the appearance of the grain in the sky. The differences just aren't noticeable looking at the photo from normal viewing distance, and barely discernible viewing the prints through a loupe, but technically there is a really small quality increment scanning at maximum resolution and downsampling in Photoshop, versus "right-sizing" the image in SilverFast.

My conclusion, based on this test and other work, is that for most intents these aren't choices over which to lose much sleep. It is also useful to remember that other factors simultaneously affect perceived image acuity – in particular fine distinctions of tonality between adjacent pixels, as discussed in Section 5.2 on "resolution we can discern".

Chapter 6
Clean-Up, Grain Mitigation, and Sharpening

6.1 Introductory Note on 1:1 Previews

In this chapter I describe the use of **iSRD, SRD, GANE, USM and Descreening**. The purpose of these filters is to clean-up images in various respects defined below. Apart from **iSRD**, the clean-up may involve visible trade-off between eliminating undesired material and retaining image detail. The matter being cleaned must be seen at **1:1 preview** size on screen (meaning one screen pixel per one image pixel) for estimating the appropriate balance between clean-up and detail retention. SF8 provides for this when you trigger the **1:1 Preview** within each of the tool panels.

Each of the filters discussed in this chapter has the same method for previewing the image at **1:1.** As well, the adjustments done with each of these filters must be set in the context of the input resolution at which the image will be scanned (Figure 6i.0 red box). This, in turn, depends on the combination of output **ppi** (Figure 6i.0, green box) and image **width** and **height** or **zoom** (Figure 6i.0, blue box). Therefore set these two dimensions first in **Scan Dimensions**, then trigger the **1:1 preview** in the clean-up filters you will be using.

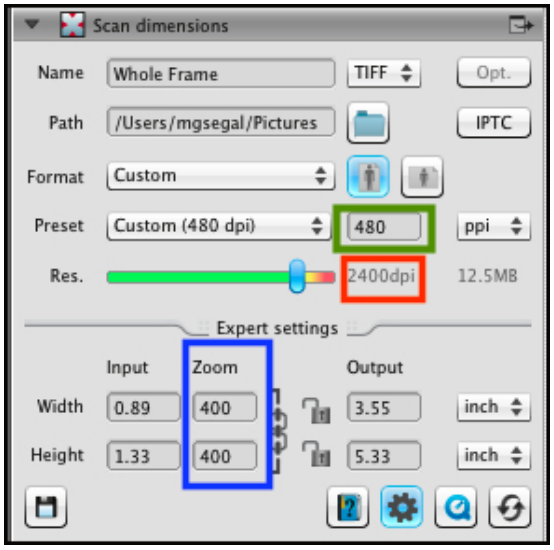


Figure 6i.0 Scan Dimensions Affecting 1:1 Preview Detail

Quite apart from these requirements for operating the filters, if you would like to examine small sections of the image at a sharp 1:1 preview that fills your scan preview window with a selected segment of the image, hover your cursor over the upper left corner of the part of the image you wish to magnify. Press and hold the CMD key, jiggle your mouse a very little bit and you will see your cursor turn to a crosshair. Without releasing the CMD key, click and drag this crosshair to the lower right limit of the rectangle you wish to include in the magnification (Figure 6i.1). Then let go of the mouse and the CMD key. The scanner will then perform a line-by-

line prescan of the magnified area, filling your scan Preview window with as sharp a preview as it can be, given the quality of the original media and your scanner lens. This can be useful for very close-up inspection of image areas for defects, artifacts, sharpness, etc. Then revert to **1:1** by pressing the **1:1** blue icon in the tool's panel.

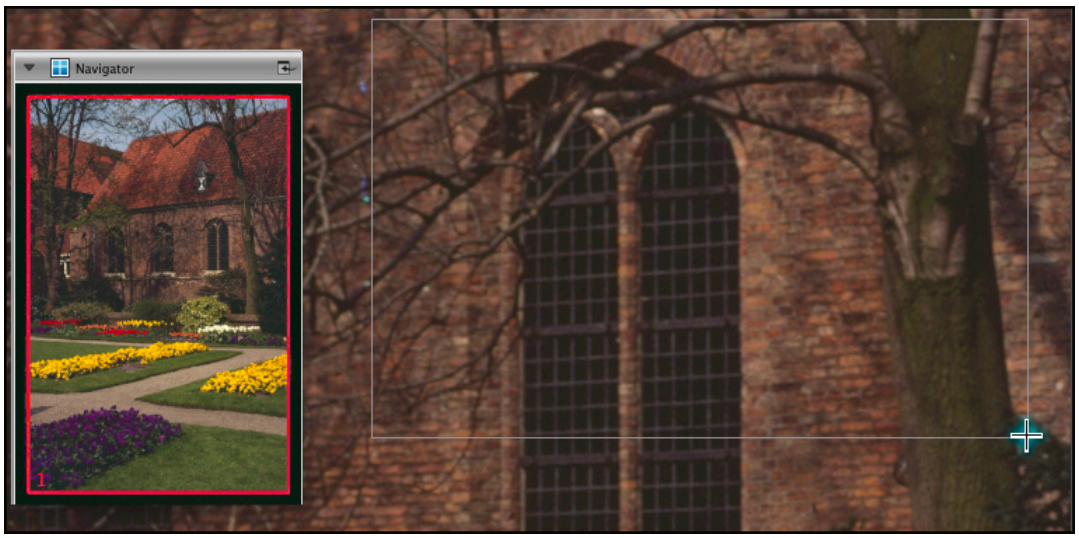


Figure 6i.1 Select Area to Magnify

I turn now to the functioning of these clean-up, grain mitigation and sharpening tools.

6.2 iSRD and SRD:

I very much recommend using SF8's **iSRD** function for removing dust, debris and scratches at the scan stage, or doing it post-scan in SilverFast **HDR**, provided you have scanned-in the infrared channel by setting the **Scan Type** to **64-bit HDRi**. The infrared channel is unavailable in external applications and must be used in SF8 or in SilverFast HDR.

There are huge advantages of efficiency and effectiveness **cleaning-up the images by removing dust and scratches** at the pre-scan or HDR stage using SilverFast **iSRD**. This tool analyzes the presence of dirt and scratches using the infrared channel in supported scanners and automatically eliminates them without adversely impacting image sharpness and desired image detail. It is a precise and effective tool, with much scope for user customization. For scanners not supporting an infrared channel, SF8's manual **SRD** tool is usable for the same purpose and also works best with the image size and resolution set first.

The **step-by-step** procedure follows here. First clean the media with a very soft brush and air blower, or use film cleaner for stubborn dirt.

1. Prescan the media and set image dimensions (Chapter Four) before activating **iSRD**. Figure 6.1 shows a sky really needing a cleanup (the white streaks and dots).

Figure 6.1 White Spots in Sky – Dust and Dirt on the Film

2. Click on the **iSRD** button in the tool column (Figure 6.2, iSRD icon, top left corner of Figure). The Dust and Scratch Removal Panel opens in the Dock (Figure 6.2, by the large red arrow).

3. Click on the **iSRD** tab (Figure 6.2, blue arrow).

4. Click on the **1:1** icon (Figure 6.2, by the black arrow). **Preview enabled** will show underneath this icon (Figure 6.3 red arrow). *You must do this in order preview iSRD effects*.

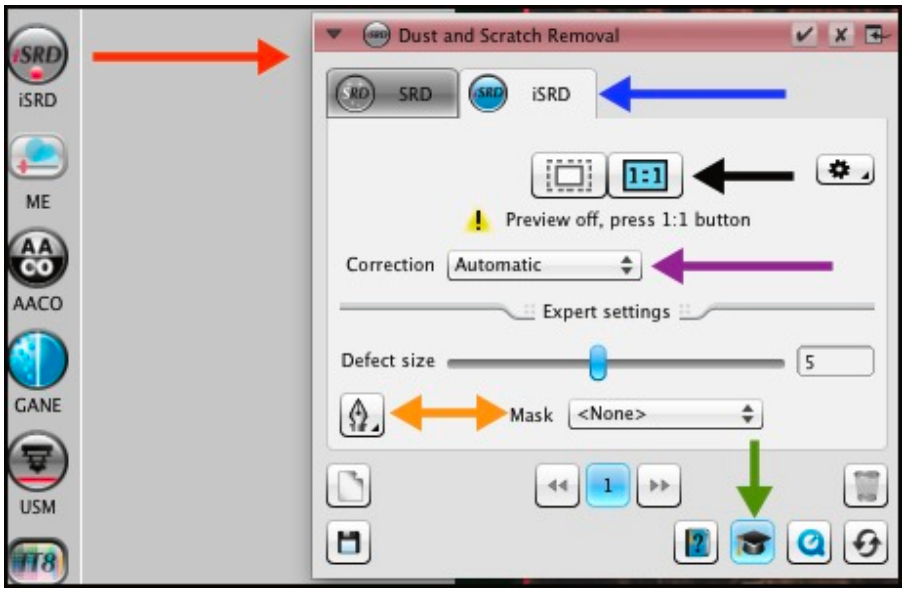


Figure 6.2 iSRD Tool Icon and Panel

Depending on your image dimensions (see above discussion on **1:1 preview**), once the preview gets to **1:1**, your navigator may show a yellow box that you can move within the red frame when the hand with the square in the middle appears within the yellow frame. This allows you to scroll around to areas you wish to examine more carefully (Figure 6.3).

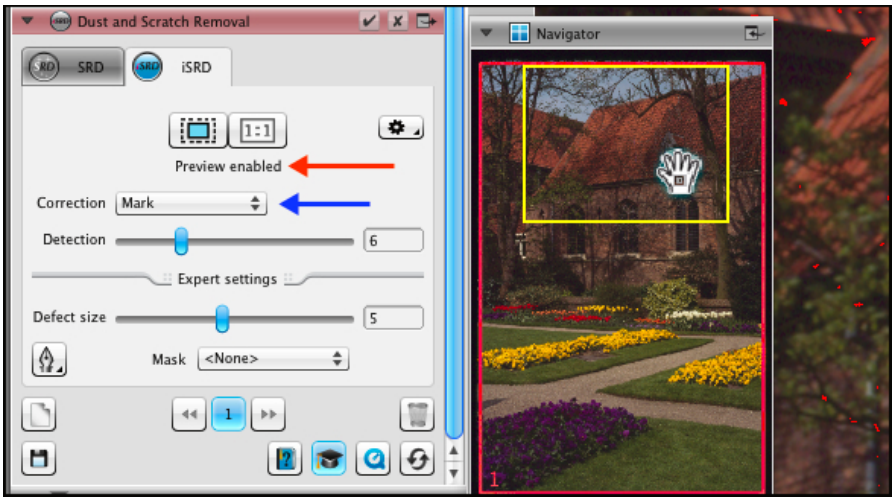


Figure 6.3 Yellow Framed Magnification Section in Navigator

5. By default, when you open the **iSRD** panel, the **Correction** drop-down menu (Figure 6.2 by the purple arrow) is set to **Automatic**, which immediately shows the debris in the image preview as having been removed (Figure 6.6). You can either trust that and move on, or review and amend.

6. To review and amend click on the **Correction** drop-down menu. A pop-menu will give you four choices: **Mark, Correct, Automatic** or **Original**.

7. Select **Mark** (Figure 6.3, blue arrow). It will identify all the debris it found in red (Figure 6.3 extreme right side, and Figure 6.5). It will also add a slider just underneath the Correction drop-down menu called **Detection** (Figure 6.4):

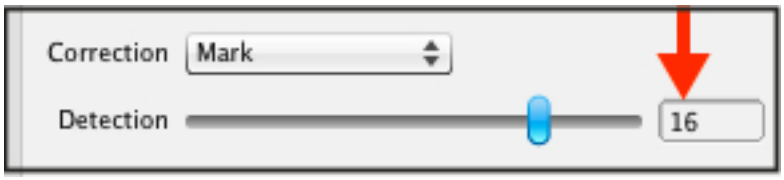


Figure 6.4 Debris Detection Controller

8. As you move the **Detection** slider back and forth you will notice that the extent of the red markings on the image preview declines as you move the slider leftward and increases as you move it rightward. The detection level is shown by a number in the box to the right of the detection slider (Figure 6.4, red arrow). You can leave it at whatever level of detection you think is satisfactory. The main point of it is to eliminate markings that are image content rather than debris.

9. Depending on your version of SF8, you may access the **Expert Settings** (Figure 6.2, grad-cap icon below the green arrow), and use the **Defect Size** slider (Figure 6.2, slider above the orange arrows) to adjust the size of the largest object you would like to be considered as debris.

Figure 6.5 Debris in Red

10. Go back to the **Correction** drop-down menu again and select **Correct**. This will show you the image with the identified debris removed to the extent allowed by the position of the **Detection** slider (Figure 6.4 with the **Detection** setting from the **Automatic** mode).

*Figure 6.6 Debris Removed **(Automatic** Correction)*

Comparing Figure 6.6 with Figure 6.1, if you had to remove all this debris manually in Photoshop or Lightroom it would take a very long time. That's why I recommend using **iSRD** at the scan stage; it will perform this task very quickly with little effort. What's more, it does not degrade image quality – it is not a blur filter.

Now, in Step 8 I mentioned the distinction between debris and image content. **iSRD** is very good at distinguishing between the two, but there can be instances where infrared detection picks-up content that isn't debris or defects. In the first instance, you can manually adjust the Defect Size and Detection sliders. If that isn't sufficient, the **iSRD** tool has a masking function (**Ai Studio**) allowing you to isolate the areas to be cleaned from those to leave untouched.

The most important point to remember about these masks is that in their default mode they mask IN the areas that will be INCLUDED in the correction. Hence, when you draw one of these masks, whatever you include INSIDE the boundaries of the mask will be corrected, and whatever remains outside will not be corrected. However, you may invert a mask (Figure 6.8a) in which case the area within the

mask will be EXCLUDED from the correction. Other mask editing functions are also available, accessed as shown further below.

To draw a mask, here is the **step-by-step**:

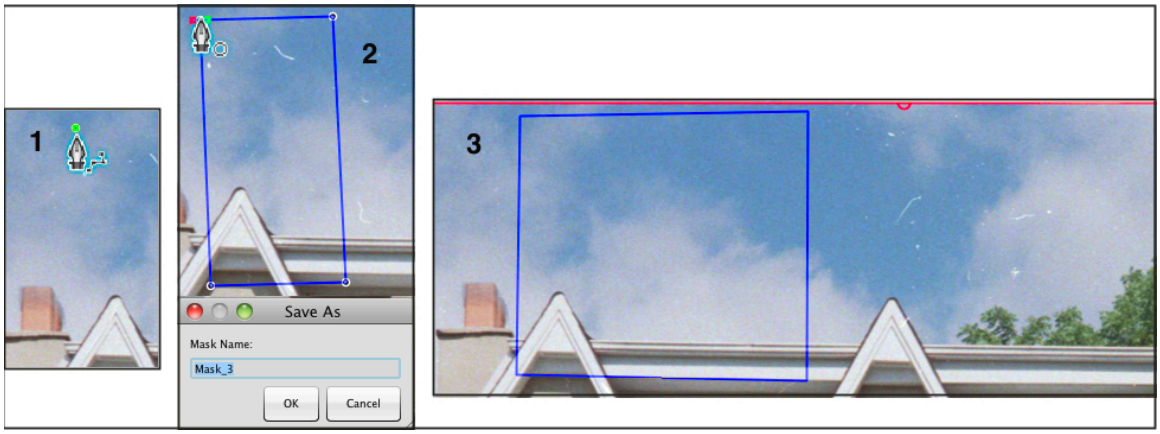


Figure 6.7 iSRD Masking Process

1. Remember to enable the preview by clicking on the **1:1** icon and have the Correction drop-down menu set on **Original** so you see the debris that you intend to be removed.

2. Click on the pen tool (Figure 6.2, left side of the orange arrow-pair).

3. Move your cursor into the image area. Your cursor will turn into a pen (Figure 6.7 panel #1). Click to establish the start point of the area to be included.

4. Outline the area you wish to include in the **iSRD** correction. To do this, move the cursor (but **do not** click-drag) to the next anchor point you wish to set, then click. Keep repeating this "two-step" of "move the cursor to the next anchor point – then click" until you have a closed shape (Figure 6.7 #2). The last line you draw this way must join the beginning of the first line.

5. Once you join the last line with the first, a **Save As** dialog will appear (Figure 6.7 # 2, lower portion, saying **Save As**). Give the mask a name and click OK. It will now be "remembered" with this image.

6. Then, in the **Correction** drop-down menu, select **Automatic** if you wish automatic cleanup of the area within the mask, or **Correct** if you wish manual cleanup. Notice how the area included in the mask is cleaned, while the area outside of it is not (Figure 6.7 panel #3).

7. In SF8 **Ai Studio**, in the **Expert** Settings you can make masks on up to four layers.

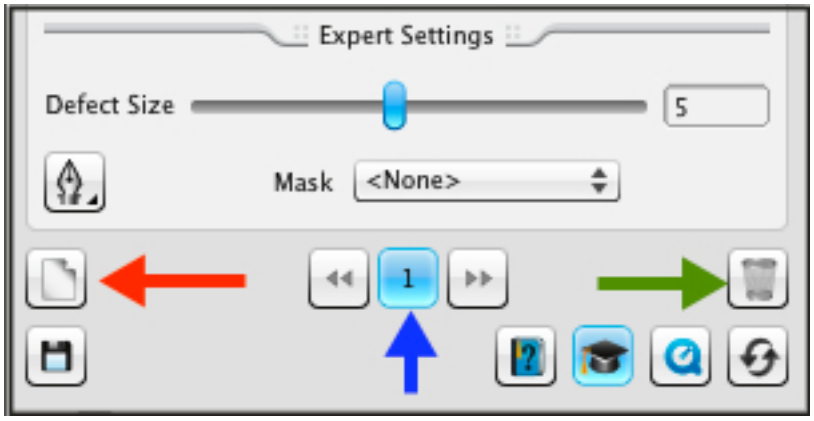


Figure 6.8 iSRD Layers

This allows you to create masks with **iSRD** effects in four different ways on the same image. To create a new layer, click on the icon just under the pen tool (Figure 6.8, red arrow). It will be numbered in blue in the center icon in the group of three in the middle of that row (Figure 6.8, blue arrow). Scroll between the layers by clicking on the arrow icons either side of the blue icon showing the layer number. If you wish to trash a layer, select it and click the trash basket (Figure 6.8, by the green arrow).

If you wish to invert, edit, move, enlarge, contract or delete a mask, you may do this by accessing the menu shown in Figure 6.8a (left panel) and selecting the action from the drop-down menu. To access this menu, first draw a mask and make sure it is selected in the **Mask** drop-down menu. Then click on the pen tool and hold until the dropdown menu appears. To delete a mask, when you select the last item on the menu, it will pull up a list of masks that are available for deletion. Select the mask you wish to delete from the list and click Delete (Figure 6.8a right panel, red arrow).

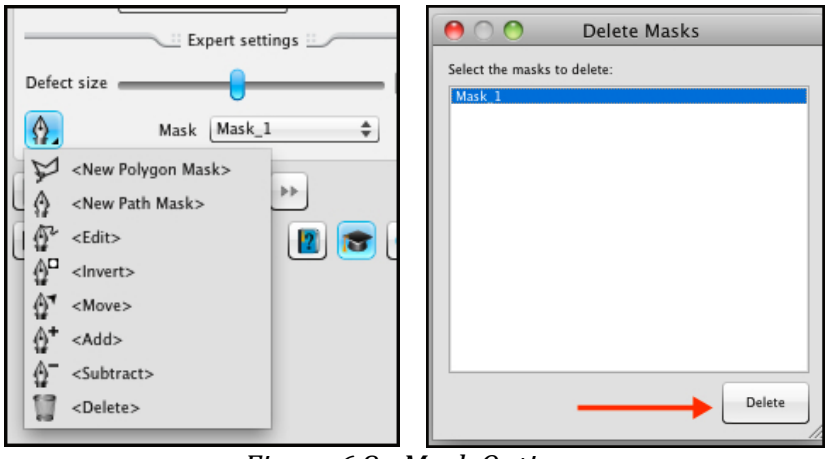


Figure 6.8a Mask Options

Infrared detection, by the way, works on everything (with supported scanners) other than Black and White Film. Some Kodachrome emulsions may also give it difficulty. For these films, and other instances of debris cleanup for which you don't

have access to the infrared function, you would use the **SRD** panel; to access it, click on the **SRD** tab to the left of the **iSRD** tab (Figure 6.9, above the red arrow).

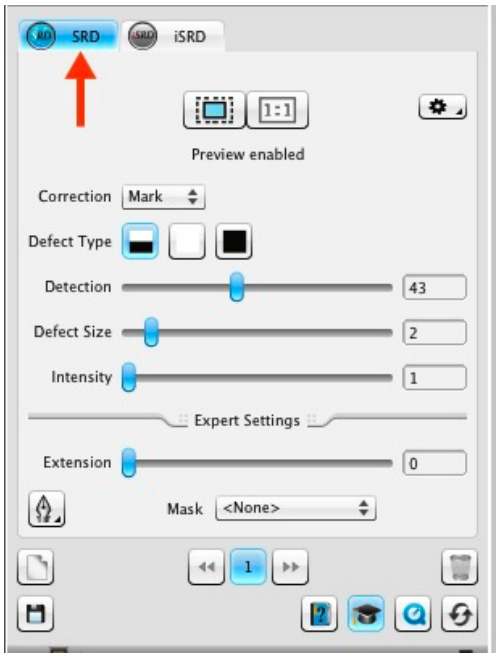


Figure 6.9 SRD Tab

Some features of SRD are similar to those in iSRD. These are:

- You enable the preview in the same way: click on the **1:1** icon.
- There are sliders for **Detection** and **Defect Size**.
- In **Expert** mode there are masks and layers, working as in **iSRD**.

The differences are:

- There is no automatic detection.
- There is no automatically optimized group of cleanup settings.
- You manage cleanup using **Detection, Defect Size, Intensity**, and in the **Expert** mode there is an **Extension** setting.

These controls are all rather sensitive, so I suggest you approach them with care. Here is what they do:

- **Detection** is the controller for the sensitivity of the distinction between debris and image detail.
- **Defect Size** is the controller for telling the application to exclude objects beyond a given size from being considered as debris.
- **Intensity** determines the strength of the debris identification within the chosen detection and size settings.

- **Extension**, in the Expert mode is the degree to which identification is extended to data similar to that identified as debris by the other settings.

Adjust all of these sliders according to the needs of the image. Shifting them to the right always increases what is included as debris; shifting them leftward reduces what is considered as debris. I recommend that you adjust to the point where debris detection begins to impair image detail to an unacceptable extent, and then stop or back-off a bit.

Within the SilverFast family there is another approach I should remind you about: doing this cleanup in SilverFast HDR. The advantage of it is that if you ever find you need to amend the way you did it post scanning, this is possible in SilverFast HDR without rescanning the original media, provided that you made the original scan in **HDRi** mode which preserves the infrared channel in the HDR file. The interface and controls are the same as those in the SF8 application.

Finally, there could be situations in which even after maximum use of **iSRD**, there remains some stubborn material you wish to remove manually. You can do this by layering and masking in the **Ai Studio** version, or by masking without layering in the **SE+** and **SE** versions. I sprinkled some pepper onto this slide, to make sure it's really, really bad (Figure 6.9a top panel). Then I maximized iSRD correction (middle panel, black defects not yet removed). Then I created separate layers each with a mask in SRD (lower panel, blue outlined masks), and shifted the controls till those defects within each mask disappeared. You see one mask at a time by selecting its layer and clicking on it in the **Mask** drop-down menu. Masking allows strong removal of debris without destroying image data.

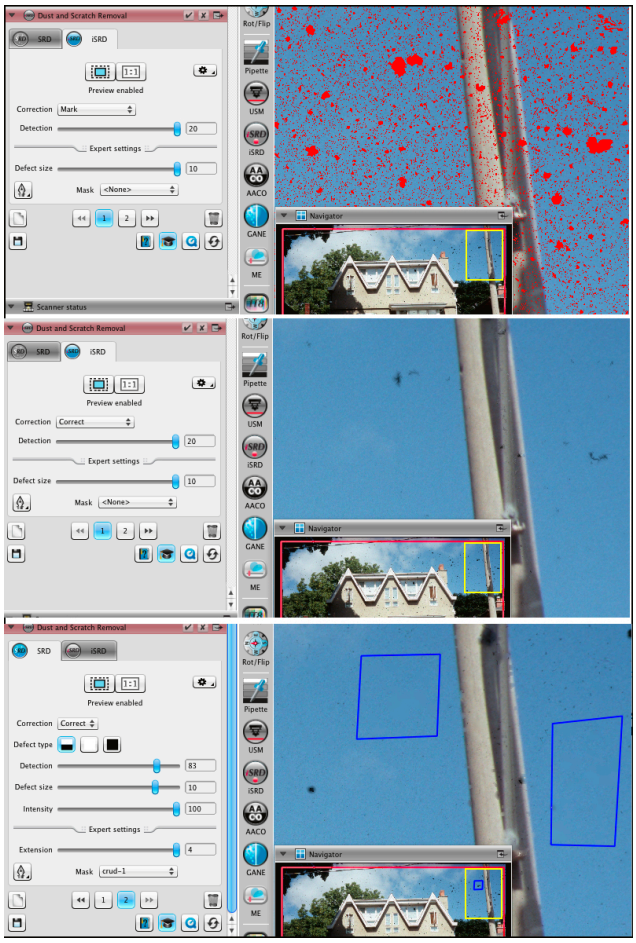


Figure 6.9a iSRD & SRD with Masks

6.3 Sharpening, Focusing and Grain Mitigation in SF8 and SilverFast HDR

These are closely related topics, insofar as all three, while different, combine to affect perceived image sharpness. There is an important consideration about workflow sequencing here. Firstly, an artistic judgment intervenes: do you wish to reduce the grain? Some people like preserving some or all of the film grain, because they think it imparts character to the photograph. Others would prefer their photos to look as clean as possible without impairing important image detail. No matter how well done, there is always *some* loss of detail resulting from grain mitigation.

Secondly, it is normal for digitized images to require at least one round of sharpening, to recover the loss of acutance (distinction of edge contrast) accompanying the digitization process. Acutance is a basic characteristic of perceived image sharpness. Digital image sharpening creates the illusion of increased acutance and sharpness by exaggerating micro edge contrast; it does this by creating tiny invisible (if it's done correctly) halos at the edges of micro detail. This is purely a software operation.

Grain is visible because it has acutance, especially in colour films where dyes are involved. If you sharpen the image while retaining grain, the grain will be sharpened, giving it an "edge" you may or may not like. I don't like it and therefore try my best to create clean, detailed scans – the look of the digital era. But others may have different taste; as well, different images "take" better to different treatment.

At this point, I must distinguish sharpening from focusing, as this is a common source of misunderstanding. Sharpening is a completely different concept and process from **focusing the image and focusing the scanner**. Sharpening is what I described just above: using software to improve the acutance or micro-contrast of edge detail.

Focusing is a hardware operation, much like focusing a camera lens, such that the light beams passing through the scanner lens project a focused image on the scanner's CCD. The scanner must be focused at the scan stage (some scanners have focusing controls, others are fixed focus). Images will be blurry if they are improperly focused in the camera or in the scanner.

No amount of "sharpening" in any image editing application will bring an out of focus image into the kind of focus that photographers would consider to be of high photographic quality, or make it look "sharp"[25].

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[25] There are industrial-strength deconvolution tools that are capable of rescuing image detail in blurred images, provided the character of the blur is well known or can be determined; but these tools do not normally find their way into most of the more usual photographic workflows.

Auto/Manual Focus: SF8 will auto-focus scanners that can be focused, provided you have auto-focus activated in Preferences. Some scanners allow manual focus adjustments. The Nikon 5000 does, and it is the one I work with here. **Auto-Focus** works very well and the scanner exhibits some depth of field – I have difficulty bettering **Auto Focus**. However, when media is quite warped, it can make sense to select the most important area of the image to be in focus and manually focus the scanner for maximum sharpness in that area[26]. SF8's **AF** tool (Figure 6.a, tool column, red arrow) is very adept for this process. I selected a negative with a lot of detailed decor on the building for illustrating the procedure in the following **step-by-step.**

Figure 6.a Auto-Focus Tool Location

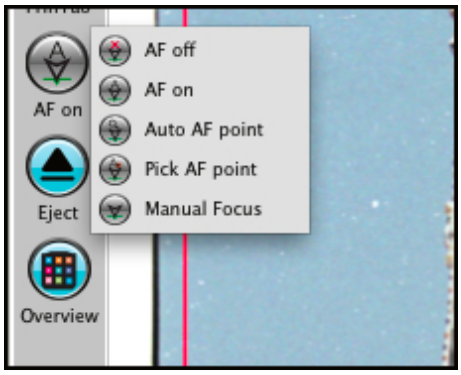

Figure 6.b AF Menu

1. Click on the **AF** tool button. A menu with five choices opens (Figure 6.b). Click on the one you wish to apply:
   i. **AF OFF** turns off scanner auto focus, if for whatever reason you wish not to let the scanner autofocus the image.
   ii. **AF ON** leaves auto-focus enabled and places a red focus point in the center of the image (Figure 6.c, red arrow).

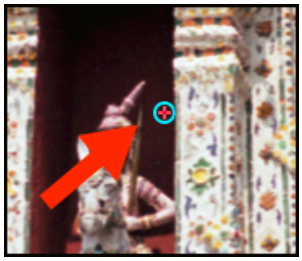

Figure 6.c Auto Focus Point

Figure 6.d Pick Auto Focus Point

[26] A thought comes to mind which I have not tried, but should be feasible: for media needing more than one focal point to be focused, make one scan for each focal point using the procedure given here, then in Photoshop "focus blend" the versions.

iii. **Auto AF Point** lets the software analyze the image and select what it determines to be the most suitable focal point for auto-focusing.
iv. **Pick AF Point** lets you select the focus point on which the scanner will perform autofocus. When you click on this option, your cursor turns into a pointer (Figure 6.d, upper panel, red arrow). Drag the pointer to the point you wish to select for autofocus, click, and that will become the focal point for auto-focusing (Figure 6.d, lower panel). If you change your mind and want another point instead, click on **AF OFF** to remove this point, and repeat this step.
v. **Manual Focus:** When you click on this option, your cursor turns into a pointer (Figure 6.e lower, black arrow). As in the **Pick AF Point** option, select the point for the areas on which you will manually focus the scanner. A **Focus Preview** panel opens (Figure 6.e, upper).

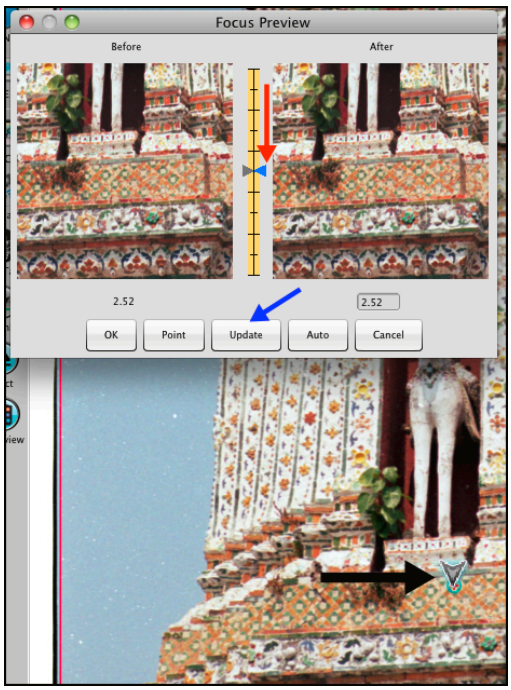

Figure 6.e Focus Preview Panel

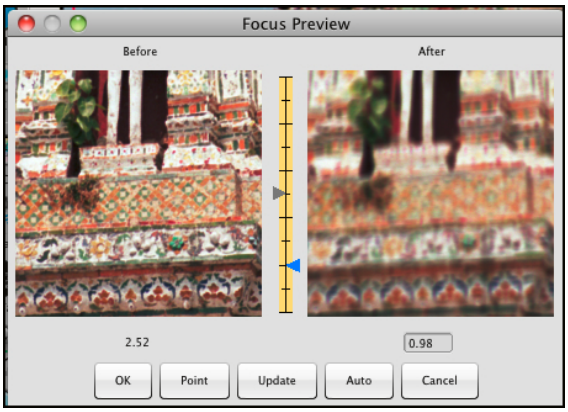

Figure 6.f Manual Focus Before-After

2. ***Using the Focus Preview in Manual Focus mode***:

i. The left preview is the sharpness status before you focus manually. The right preview shows the result of your manual focus adjustment.
ii. Adjust the scanner's focus by clicking and dragging the little blue marker (Figure 6.e, red arrow) on the right side of the yellow scale strip between the two panels.
iii. Then click **Update** (blue arrow) and the scanner will perform a quick prescan giving you a preview of the result of your selection (Figure 6.f, right side), intentionally over-adjusted here to be blurry, just to show you that it works. [Unfortunately I don't have media warped enough to show an

example where the starting point is less sharp than achievable with auto-focus, but you get the idea.]

iv. While in this Focus Preview, you can switch to Auto-focus by clicking on the **Auto** button to the right of the **Update** button, or you can cancel by clicking the **Cancel** button, or you can change the focus point by clicking the **Point** button and selecting a new focus point in the image. Click **OK** (left button in the **Focus Preview** panel) when you are satisfied with a focus result

Turning back to sharpening, if you intend to mitigate grain and sharpen the image in SF8, I recommend that you operate the **GANE** function first, for dealing with grain, then use the USM function to sharpen the grain-reduced image. I also recommend scanning to SilverFast HDR, archiving the master file as a SilverFast HDR scan, and using the HDR application for grain reduction and sharpening. This way, if you decide later that you don't like the outcomes, you can go back to the scan and amend these settings without rescanning the image.

If you intend to use Photoshop or plug-ins for these functions, I recommend that you not do them in SilverFast also, but once inside those applications, you reduce grain on a copy layer, then sharpen the grain-mitigated image using bespoke sharpening layers; in this way, you won't sharpen the grain and both operations are reversible. You can also mitigate grain and sharpen in Lightroom – both operations reversible.

Regardless of where you sharpen and manage grain, Figure 6.10 shows the kind of effect you wish to avoid: an over-sharpened, grainy image in which the most obviously sharpened material is the grain.

Figure 6.10 Sharpened Grain and Scanner Noise

Sharpening at the scan stage should be at most only mild **Capture Sharpening** if you will be using a multi-stage sharpening workflow in Photoshop thereafter. This is discussed below from section 6.7.

Whatever the workflow for grain mitigation and sharpening, I advise that higher resolution images in high bit depth will tolerate more of both with less risk of collateral damage to image detail and appearance.

I demonstrate workflows within and outside of SF8, starting with the option to reduce grain and sharpen the image in SF8 or SilverFast HDR. This work can be done in either. Here are the **step-by-step** procedures.

6.4 Reduce Grain and Sharpen in SF8, or post-scan in SilverFast HDR

Before you make the scan, click on the **GANE** button, in the tool column to the right of the Dock (Figure 6.11, red arrow). A menu will open in the Dock warning you that **Preview** is off (yellow triangle with exclamation point), and asking you to click on **1:1** for a **1:1 preview** (Figure 6.11, green arrow).

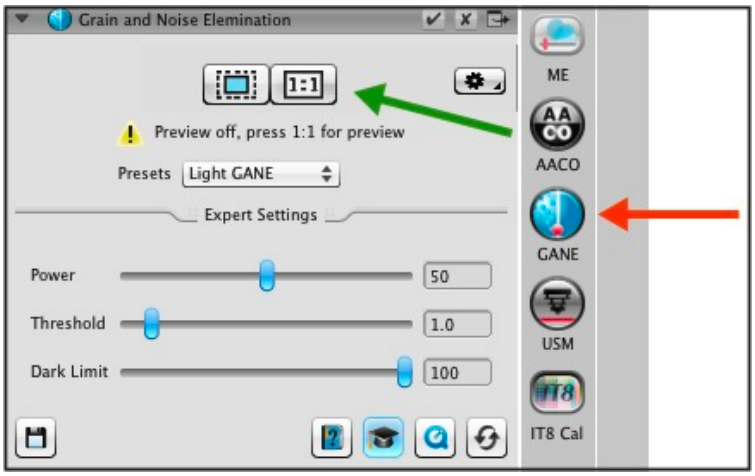

Figure 6.11 GANE Panel and Access Icon

1. Click on **1:1**. This allows you to judge the trade-off between image detail and grain removal more accurately.

2. Depending on image resolution, the **Navigator** may give you a yellow frame you can move around to select an appropriate area for examination (Figure 6.13). I recommend selecting an area that has important detail you wish to preserve, and at the same time allows you to distinguish grain from image detail (Figure 6.12 is such an example).

Figure 6.12 Magnified Preview for GANE

3. You should see evidence of grain and perhaps some scanner noise (usually cyan and magenta speckling where there should be none, as evident in this test photo – area around the red arrow in Figure 6.13

Figure 6.13 Magnified Area for GANE

4. In the **GANE** panel, the drop-down menu for the **Presets** will allow you to select one of **Light GANE**, **Medium GANE** or **Strong GANE**. You may find it useful to scroll all three, watching for the one giving you the most satisfactory balance between grain mitigation and detail retention.

5. If you have access to the **Expert** mode (click on the grad cap icon, bottom of **GANE** panel), you have three controls for customizing the impact of GANE:

- **Power**: determines the strength of the effect; rightward shift increases it.
- **Threshold**: For distinguishing between noise and image detail. The higher the value (shifting the slider rightward) the more micro detail is accounted as noise to be removed.
- **Dark Limit**: Moving the slider rightward increases acutance sharpening.

6. When done, click the icon to the left of **1:1** in the **GANE** panel to return to the normal, full image preview.

7. Now, to **sharpen the image**, click on the **USM** icon, located in the tool column under the **GANE** icon. This opens the sharpening panel in the Dock (Figure 6.14, red arrow).

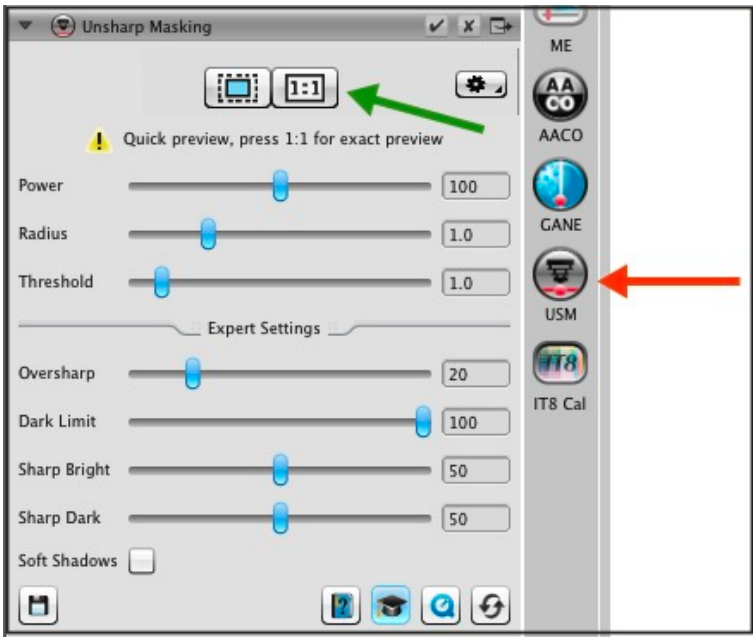

Figure 6.14 USM Icon and Panel

8. Click on the **1:1** (Figure 6.14, green arrow). Depending on image resolution, you may get a yellow frame like the one in Figure 6.13. I recommend selecting an area that has important detail you wish to see sharpened. You do this by clicking and dragging in the yellow-framed area to move the yellow frame over the portion of the image you wish to inspect.

9. Use the **Power, Radius** and **Threshold** sliders to set the degree of sharpening you consider appropriate.
   - **Power** increases the strength of the effect as you move the slider rightward.

- **Radius** sets the width of the halo created around micro-edges. The wider it is the more apparent the sharpening effect. Moving the slider rightward widens the halos.
- **Threshold** specifies how far apart the tones of adjacent pixels need to be before the tool considers this contrast difference as an edge to be sharpened. Recall, an edge is only created by contrast between adjacent pixels. Moving this slider to the right increases the threshold before adjacent pixels are contrasted enough to be considered an edge; hence higher threshold values restrain the sharpening impact and lower values increase it.

10. There are additional controls in the **Expert** section, which you access by clicking on the grad cap icon in the bottom right row of icons within the **USM** panel.
    - **Oversharp** reduces the effect of artifacts around the sharpening edges, with complete suppression at zero, and decreasing suppression as the slider is moved rightward. The effect is quite subtle.
    - **Sharpen Up To**: This control determines up to what level of image darkness the sharpening effect takes hold. As you shift the slider from left to right, the tonal range starting from white (0) and moving through gray onward to black (100 at the far right) included in the sharpening increases. The idea underlying a value somewhat less than 100, is that dark areas often contain more visible noise, which it makes sense not to sharpen. The effect is quite subtle.
    - **Sharp Bright, Sharp Dark**: As you shift these controls rightward they expand the light and dark contours respectively that the USM filter purposely creates at the edges to be sharpened. The appearance (really, the illusion) of sharpness depends on how you set these sliders. Good sharpening technique produces the illusion of sharpness created by these contours, without the contours themselves being visible in the output. I recommend increasing them from their default values carefully, to prevent the image from looking crunchy and over-sharpened.
    - **Soft shadows**: Checking it smoothens dark shadow areas. This effect is quite subtle.

A Word to the Wise about Grain Reduction and Sharpening

Once you implement grain mitigation and sharpening in SF8 (not using SilverFast HDR) at the scan stage and you then scan, the effect of these settings is "baked-in" to the image. If you find later on that you don't like what you did, you will need to rescan the original media. As well, these tools do not allow for performing localized grain mitigation or sharpening (i.e. having different strength or type of these effects in different parts of the image). If either of these factors may be a concern to you, I recommend that you avoid both grain mitigation and sharpening at the scan stage, and instead use bespoke tools in post-scan image editing applications.

6.5 Reduce grain and sharpen in SilverFast HDR

The procedure is similar to that described above. I remind that the key advantage of doing these operations in SilverFast HDR is that if you have saved the file as an HDR archive by scanning it using one of the HDR scan type options, you may revert to the HDR file any time to redo the settings for these filters without having to rescan the image.

I leave this topic on a final note about the overall approach here - the sample photo I intentionally selected (Figure 6.16) points to a generic issue – that of the balance between visible grain and sharpness. The original media is a fairly grainy colour negative film, and the photo is of a huge structure photographed from at least 75 meters away, both factors challenging the resolution of fine detail.

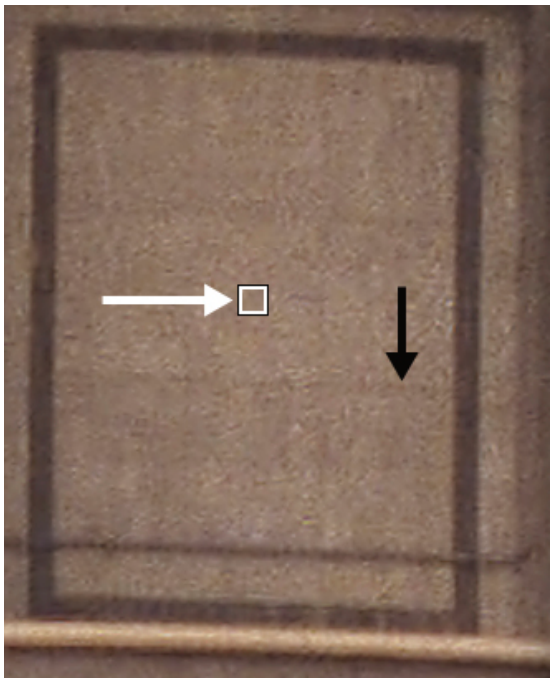

Figure 6.15: detail from……..

Figure 6.16 Basilica, Cote d'Ivoire

The objects of the sharpening are the fine borders separating the concrete panels under the dome (Figure 6.15, black arrow, for example). The concrete itself has some texture (made more visible magnifying a small detail such as that within the white box of Figure 6.15), but the real texture is completely obscured by film grain.

If one sharpens enough to bring out those borders, unless the grain reduction has been very well done, the grain is also sharpened. One can of course mistake the

grain for texture and be led to believe that mitigating it blurs essential image detail. But this is not necessarily the case. False detail is being mitigated, while real detail should be preserved enough so that with some sharpening it holds its own.

6.6 Descreening

De-screening is for removing screen dots from printed images (except original photographs, to which this issue does not apply). Images prepared for various printing presses use screens to control the ink lay-down giving the image its tonality. The screens are made up of tiny dots. Scanners may detect and reproduce these dots in an unflattering manner if left alone to scan the document "as is". Figure 6.17 shows a 200% magnification of a scan section from a high quality technical magazine circa 1963.

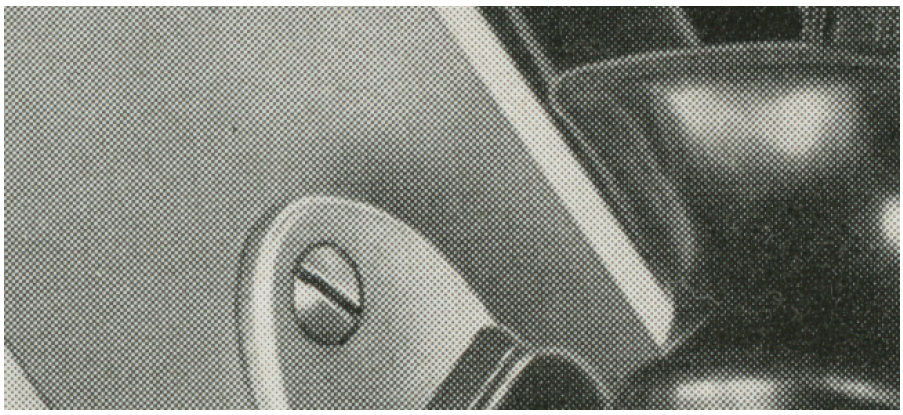

Figure 6.17 Offset Printing Screen

The screen is not necessarily detectable at normal viewing magnification, as shown by looking at a much smaller reproduction of the whole image (Figure 6.18, magnified area in red box).

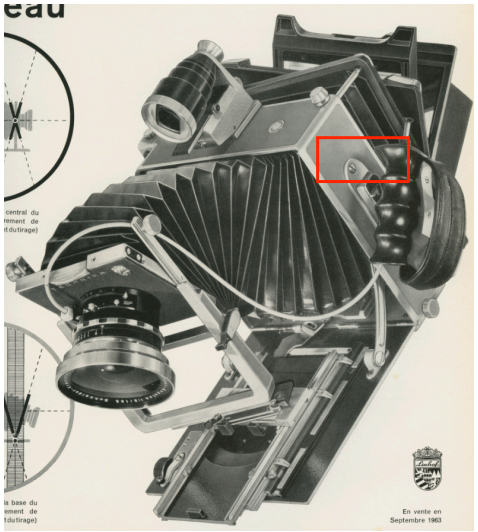

Figure 6.18 Source Scan for Figure 6.17

You should verify whether the screen would be visible in your final output conditions (by doing a trial scan) before implementing the **Descreen** tool in SF8, because, very much like grain mitigation, the use of such tools always involves *some* compromise on image detail. Much recent print screening is not so visible. If the image should be de-screened, do it in SF8, because this is the only application that has a filter to retain text. Uniquely, SF8 can differentiate between text and images, leaving the text sharp and not softened by the descreening. This could be very helpful not only for readability, but also if optical character recognition (OCR) were needed at some future time.

Here is the **step-by-step** for de-screening in SF8.

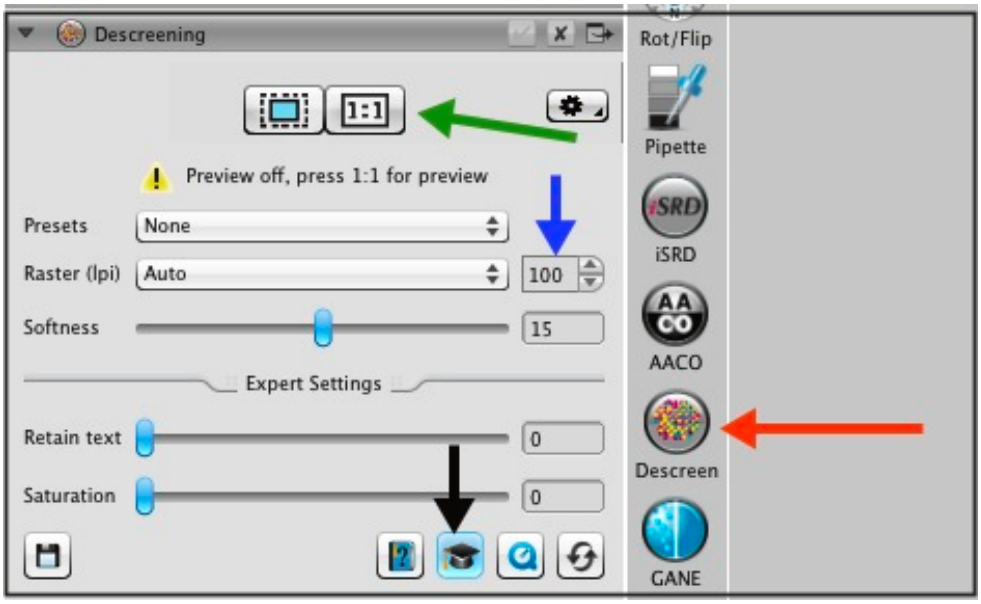

Figure 6.19 Descreen Tool Panel

1. Click on the **Descreen** tool icon (Figure 6.19, red arrow). The **Descreen** panel will open in the Dock (Figure 6.19, left of tool icon).

2. Click on the **1:1** icon (Figure 6.19, green arrow) to obtain the **1:1** preview. Depending on the image dimensions, you may get a dialog looking like then one of Figure 6.3, allowing you to scroll to the desired area for inspection. Underneath the magnification icon you should see **Preview enabled** written there.

3. You may select a preset by clicking on the **Preset** drop-down menu (under the **1:1** icon) and click on one of the two choices in that menu: **Newspaper** or **Magazine**. If you click **None**, you remain in manual mode with no preset. If you are satisfied with the appearance of the results, you are finished this process.

4. If you prefer to make a custom adjustment, select "none" in the **Preview** pane, and revert to the **Raster** and **Softness** controls just below.

5. **Raster (lpi)** gives you the choice of manually entering the **lp**i most closely reflecting your media (Figure 6.19, box under the blue arrow), or setting it on **Auto**, or using one of the three other presets in that drop-down menu (**Newspaper, Magazine, Fine-Art Book**). The lower the **lpi** setting, the more obscured the screen becomes. You need to watch for the point at which obscuring the screen also begins to obscure image detail you wish to retain.

6. **Softness** performs as advertised: as you push this slider to the right, the screen is increasingly softened to obscure it's detail; same warning as above. Figure 6.20 compares No Descreening with a Magazine preset, showing how the screen can be mitigated, but see especially how the texture of the leather handle is also softened.

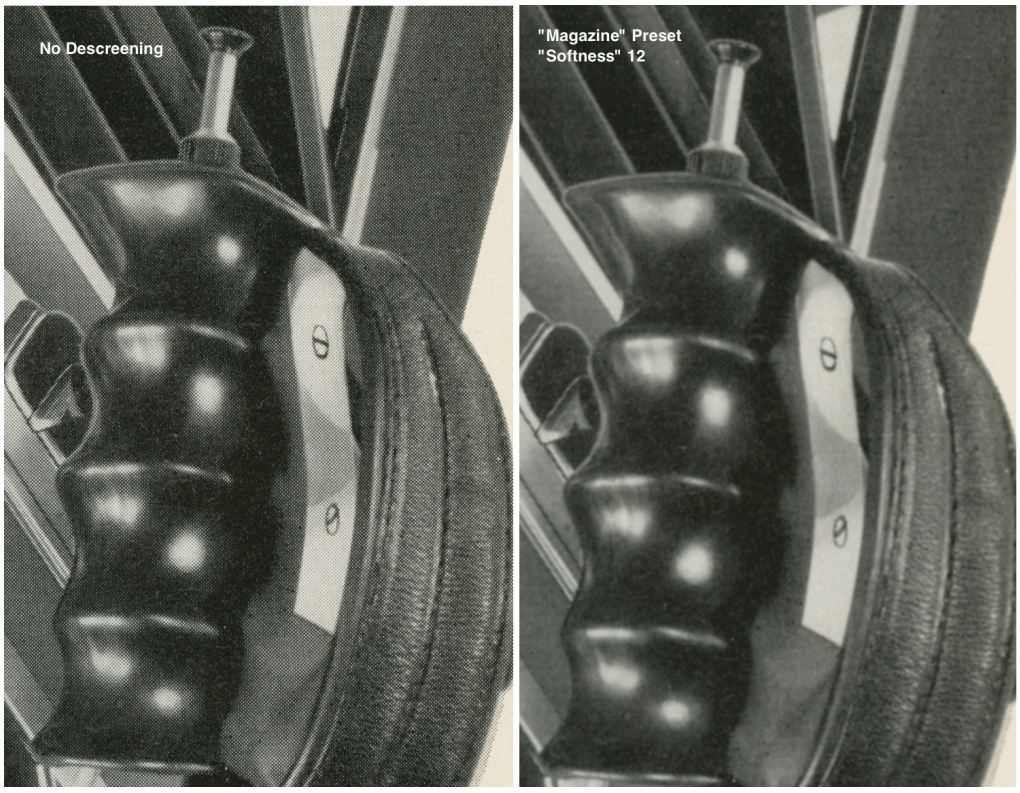

Figure 6.20 Descreen OFF & Magazine Preset Compared

7. By clicking on the grad-cap icon (Figure 6.19 black arrow), you access the **Expert** settings **Retain text** and **Saturation**. As you move the **Retain text** slider to the right, image contrast increases and detail is brought back – including remnants of the screen unfortunately, in order to preserve the clarity of text; hence it is a matter of finding the appropriate balance. As you move the **Saturation** slider to the right, it very moderately saturates black for increasing clarity of text. This is an important and unique feature of

SilverFast, because the ability to retain the clarity of text can be very useful not only for easier reading, but for example if there were any intention to apply optical character recognition (OCR) to the document for digitizing it.

8. You may leave this panel once you are finished making the required settings.

The interface for doing this in SilverFast HDR is similar.

6.7 Grain Mitigation and Sharpening Outside of SilverFast.

The two options I find particularly effective are to do this either from Lightroom or from Photoshop plug-ins. It is beyond the scope of this book to provide detailed instructions for the use of these applications – much excellent material is available elsewhere; here, I provide general guidance on the concerned workflows.

Regarding grain reduction, the tools available in Lightroom or Photoshop are not really bespoke grain mitigation tools. They are industrial-strength digital noise removers. They work by differentiating various colour and luminance patterns from image detail and mitigating them. It so happens that a number of them can mitigate grain in a very controlled manner, and this makes them particularly useful for a scanning workflow. The noise reduction tool in Lightroom has improved markedly with the latest versions of the software and rivals the main Photoshop plugins.

6.8 Grain reduction and Sharpening in Lightroom

To begin this workflow in Lightroom, Chapter Two describes two options for getting the images into Lightroom. Once there, you go to the Develop module, and scroll down the right-hand column of tools until you reach the "Detail" panel (Figure 6.21).

Figure 6.21 Grain Reduction and Sharpening in Lightroom

Sharpening is in the upper part and noise reduction in the lower half of this panel, both under the preview window, which shows a 100% magnification of a small area of the image you can select.

Lightroom, like SilverFast, has a logic to the workflow (in Lightroom moving from left to right across the modules and from top to bottom in the right-side tool panel), but file processing occurs in an optimal manner "under the hood" regardless of the order in which you make your settings. This makes it feasible to play back and forth between grain reduction and sharpening until you have struck the appropriate balance. To see the effects in the main photo preview window, magnify the image to 100% by clicking on **1:1** (upper left side of the Interface, right of the **Navigator**).

I prefer to begin the process with grain reduction, then recovering lost acutance by using the **Detail** controls in the noise reduction tool, and those in the sharpening tool. Usually some iteration between these tools is required.

Noise Reduction has separate controls for luminance noise and colour noise. This is helpful, especially in this demonstration photo (same as Figure 6.16), which suffers from both scanner noise and considerable graininess (Figure 6.22, upper portion). The grain is the sandy-looking stuff and the scanner noise is the magenta/green speckling, particularly evident in the concrete. The **Luminance** slider does a decent job on the grain and the **Color** slider a decent job on the scanner noise (Figure 6.22, lower portion), while preserving those fine lines separating the concrete panels in the construction between the columns under the dome.

Figure 6.22 Lightroom Grain Reduction and Sharpening; Before & After

Lightroom breaks the sharpening workflow into two stages – "capture sharpen" and "output sharpen". Capture sharpening mitigates the softening effect of the digitization process, while output sharpening is specific to the final output format of your photo (e.g. prints at their final size and resolution, web graphics, etc.). For scans, you would implement the capture sharpen stage in Lightroom within this same panel, but not the output sharpening (in the Print and Web modules) until you intend to print or to create a web gallery of the scanned images in Lightroom. One truly attractive feature of the sharpening tool in Lightroom is the ability to mask low frequency data (such as sky masses and skin tones) from being over-sharpened. You may also Capture sharpen in Lightroom, and if printing from Photoshop, Output sharpen in Photoshop.

In Lightroom's Capture sharpening, as you increase the **Amount**, the **Radius** and **Detail** effects are applied more strongly. You use **Radius** values less than 1 for high frequency images (lots of fine detail) and greater than 1 for lower frequency images. **Detail** distinguishes edges from halos. Lower values suppress halos and allow higher **Amount** for more edge sharpening; higher values accentuate halos and show more of the sharpening effect. Increasing the **Masking** blocks out increasing amounts of material from being sharpened.

6.9 Grain Reduction and Sharpening in Photoshop

The grain reduction and sharpening workflow has different constraints in Photoshop, because here, the order in which one arranges these functions matters; therefore, unlike SilverFast HDR and Lightroom, you must know the correct way of maintaining reversibility, it isn't automatically catered for. Specifically, to maintain reversibility, reduce grain and sharpen the image on separate layers, making sure the Layer order works so that the grain-reduced image layer is what gets sharpened. Furthermore, it is preferable to mitigate grain and implement capture sharpening before doing tone and colour edits, so that you perform the latter on a clean image.

I prefer to use state-of-the-art dedicated noise reduction and sharpening plug-ins for Photoshop, because of the very granular control and high quality results they provide. My favorites at time of writing are Topaz Labs DeNoise 5 for grain mitigation[27], and Pixelgenius Photokit Sharpener 2 for sharpening.

These software developers provide good instructions for using their applications, so I focus here on general guidance for the workflow. To use this workflow, of course, do not implement **GANE** or **USM** in SilverFast, nor would you necessarily do any of this in Lightroom/Camera Raw. Instead, scan the image in SF8 in 48-bit Color and open it in Photoshop.

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[27] At the same time I also recommend that Neat Image, Noiseware and Noise Ninja are all useful for this purpose and produce very good results.

Create a duplicate image layer, rename it so you will remember what it is for and make sure it is the active layer (figure 6.23).

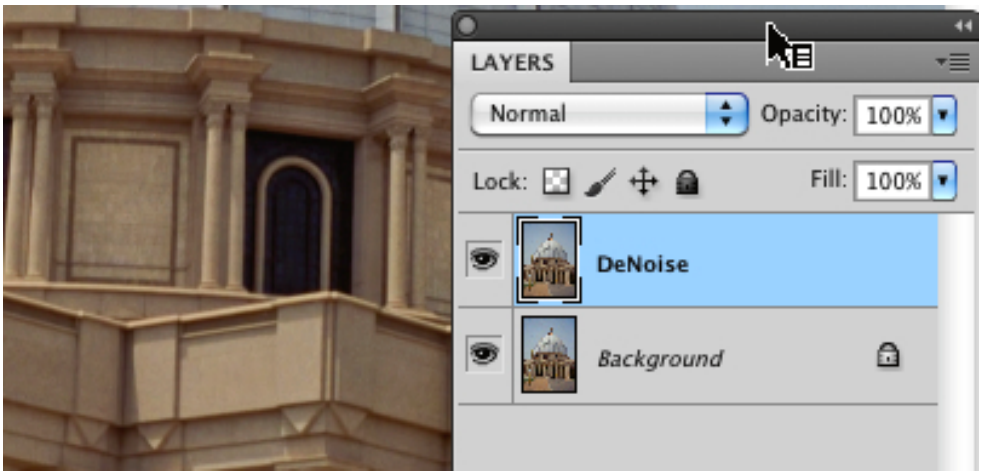


Figure 6.23 Grain reduction Layer in Photoshop

Launch Topaz DeNoise. Its preview window zooms the image to 200%, and it allows you to see clearly the "before" and "after" impact. You may wish to be a bit wary of a 200% preview, because 100% is the optimal magnification for estimating sharpness, insofar as it corresponds one image pixel with one display pixel. Magnified beyond that, your visual impression of blur could be exaggerated compared with the results you'd see in a print or on a device display. The 200% view is, however, handy for viewing the impact of adjustments on colour noise, so I retain it in the demonstration of the Topaz DeNoise interface (Figure 6.24)

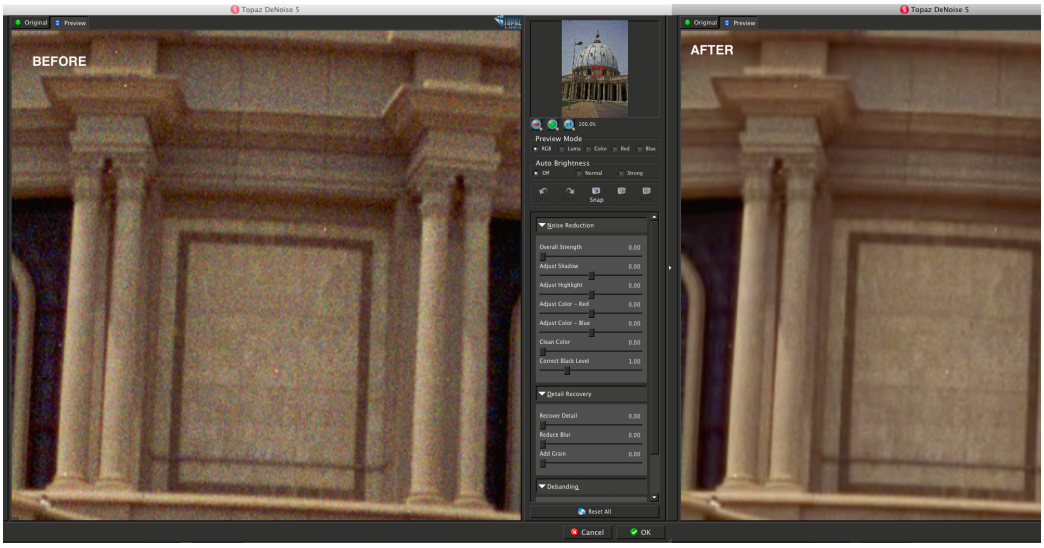


Figure 6.24 Topaz DeNoise Interface with "Before and After" Effects

The key features (not exhaustive) of this interface can be summed-up as follows for our purposes, following from top to bottom of the control panel.

At the top of the panel you get a thumbnail of the photo with the magnified area delineated in a red box.

- You can select the degree of magnification you prefer.
- The large preview window to the left of the panel is big enough to occupy much of your display and show you the impact of adjustments very clearly.
- The **Preview Mode** allows you to see the large preview in full RGB colour, Grayscale, Color only, the Red channel and the Blue Channel.
- The main and most effective noise and grain mitigation control is the **Overall Strength** slider. The sliders underneath it allow independent controls minus/plus the **Strength** effect, as fractions of the **Strength** effect for highlights, shadows, red channel and blue channel (which latter are seen in monochrome).
- It does have a detail recovery panel, but I find I get better results doing this in a more specialized sharpening application.

One disadvantage of this workflow compared with that in Lightroom is that you cannot as easily work interactively between grain reduction and sharpening. I get around this by implementing grain reduction first, but in so doing, exercise careful judgment about the distinction between grain and real image detail, preserving enough of the latter so that a round of sharpening will recover the detail without bringing back much of the grain. This is an acquired skill, after a bit of experience on a number of different images.

Grain tends to be less noticeable in high frequency areas of the image, compared with low frequency areas such as skin tones and sky. You can almost have the best of both worlds in Photoshop – unaffected high-frequency detail and grain-reduced low-frequency image areas, by adding a "Reveal All" layer mask to the grain mitigation layer and hiding some or all of the grain mitigation (by adjusting black brush opacity) in those high frequency areas where you think it helps to preserve image detail.

Once you've finished mitigating grain, open Photokit Sharpener from within Photoshop. Before going further, a few words concerning what I like best about this application: sharpening is customized to the requirements of the type of input and the type of output at hand, and the creative effects you may want.

- Everything it does is easily reversible.
- It has a huge number of built-in algorithms for different sharpening, smoothing and related creative effects (Figures 6.25 and 6.26). Chances are very high that one of them will suit your image well.
- Each one of them can be fine-tuned by either adjusting its layer opacities (Figure 6.27 shows the layer structure for **35 Slow Negative Film**) or adding layer masks to its layers for localizing its impacts.
- Used intelligently, the quality of the results is superb.

- It's **Auto-Sharpen** setting, in the **Effects** where it is available, on the whole works very well, making this a generally quick process to implement.

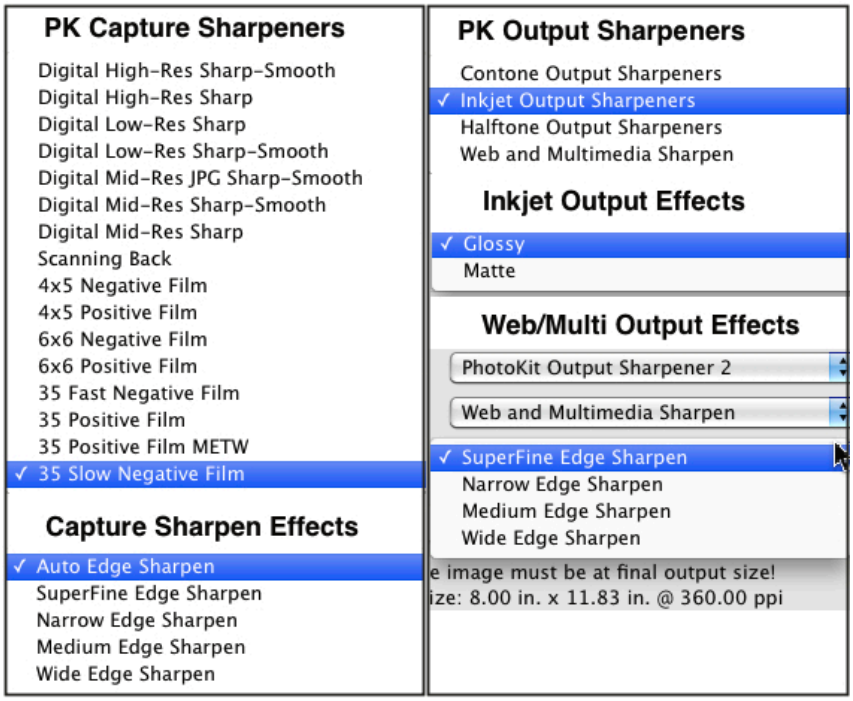


Figure 6.25 Photokit Sharpener Main Menu Functions

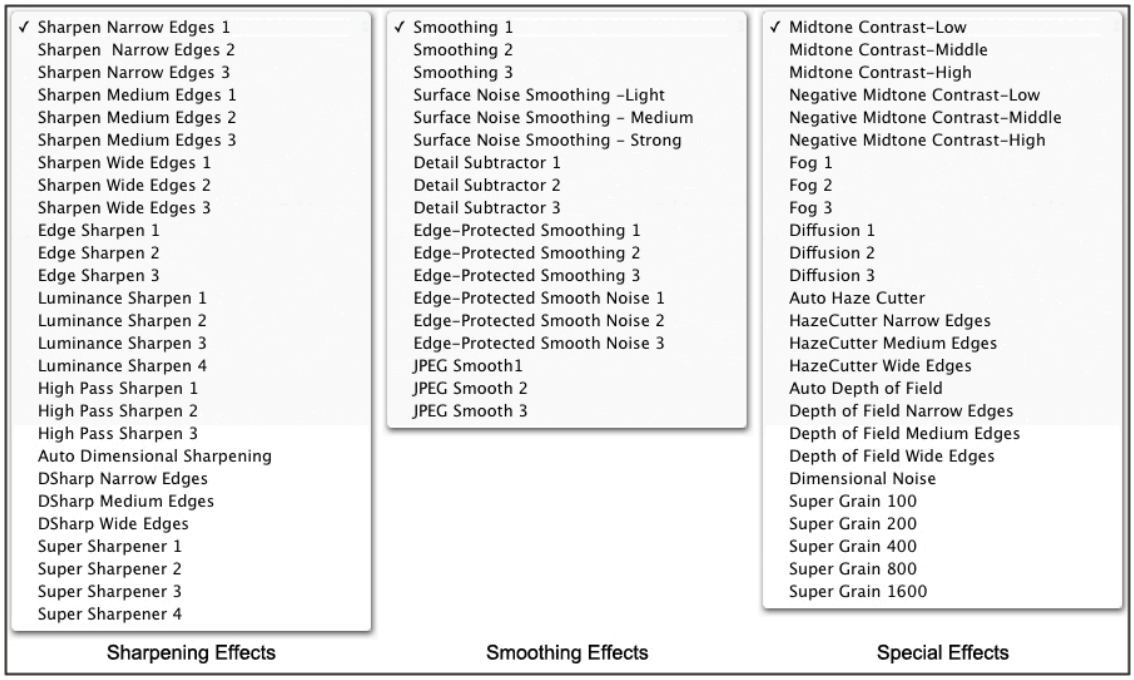


Figure 6.26 Photokit Sharpener Pro 2.0 Creative Menus

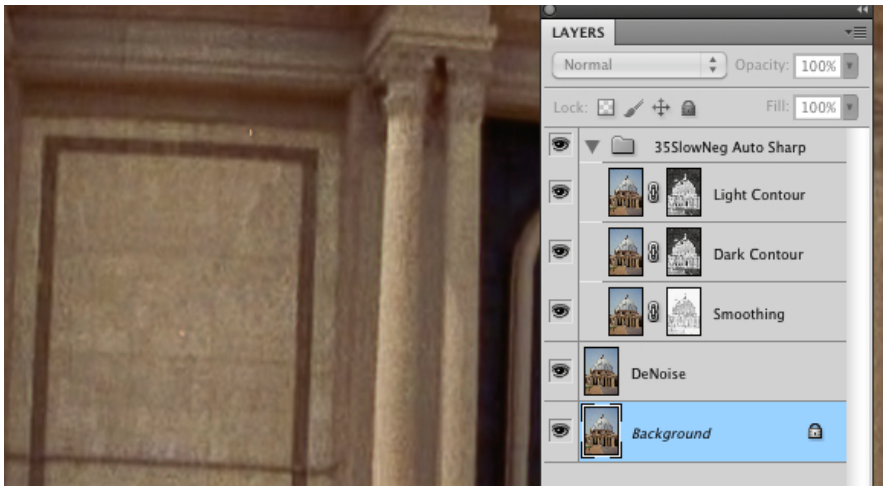


Figure 6.27 Sharpening Layers Built on DeNoise

I find that for 35mm negative and positive scans, one of four presets usually makes a particularly good starting point (or even end-point). These are: Capture Sharpen>35 Slow Negative Film>Auto Edge Sharpen, Capture Sharpen>6x6 Positive>Auto Edge Sharpen, Creative Sharpen>Luminance Sharpen 2 and Capture Sharpen> Luminance Sharpen 1, in decreasing order of impact.

I show the results of implementing this two-stage workflow to reduce grain and sharpen the image in Photoshop using these plugins (Figure 6.28).

Figure 6.28 Topaz Plus Photokit Sharpener Before and After

For yet more control, you may confine sharpening effects to certain image areas by adding a "Reveal All" layer mask to the top-most layer of the sharpening group and painting out the sharpening effect either completely or partially, depending on the black brush opacity.

I normally don't flatten the grain reduction and capture-sharpening layers until at least after I've printed the image and satisfied myself that I shall not need to revert to them. They do consume a large amount of storage. I find that with film scans it is seldom necessary to implement output sharpening after implementing the foregoing operations. In any event, it is ill-advised to flatten an image with Output Sharpening baked-in, because Output Sharpening is image size and resolution specific. Hence, whatever you may have "baked-in" will be inappropriate should you decide later on to repurpose the image and need different resolution or output dimensions.

As elsewhere in this book, I don't intend to steer readers toward one workflow or another. I'm presenting the options I know best, and you the readers should use whichever best suits your taste, requirements and circumstances. My closing words on this subject are that this is an extensive chapter because the operations covered here can be done in many ways and the quality of their implementation has a major impact on the quality of your final results from scanning.

Chapter Seven
Luminosity

7.1 Introduction:

"Luminosity" is about brightness and contrast. This chapter explains how to control them in an image scan. I first discuss brightness and contrast concepts, then how to implement them in SilverFast. Chapter Ten shows some complementary luminosity adjustments in the post-scan workflow using Lightroom.

Luminosity is most easily understood in the context of grayscale images ("black-and-white) and the grayscale luminosity range, so I shall discuss it that way in this chapter. But the same concepts apply to each of the RGB primaries constituting a colour photo. I'll introduce colour later in the chapter and I devote all of Chapter Eight to it.

There is much debate in Internet forums about whether it is best to make these adjustments – and the colour adjustments described in the next chapter - in the scan software, or in Lightroom or Photoshop. For us, this is a non-debate. There are two robust answers, based on considerable experience with scanning film: (i) the post scan editing workflow can be faster and can retain more scope for further adjustments by implementing an initial set of tone and colour adjustments in the scan software, so that the image starts life better adjusted in post-scan editors; (ii) beyond this, it is a matter partly of personal preference and partly of what tools do the best job in your hands for the correction task in play.

I discussed the luminosity scale in the opening section of Chapter Five on Bit Depth, where I showed the usefulness of high bit-depth for assuring smooth tonal transitions through the tonal range from black to white.

A very important photographic property of tonal transition in any image is "contrast". Contrast means the extent of tonal variation within the image. This is under your control in SilverFast and in external image editing applications. Absent colour, contrast allows us to distinguish one object from another. Contrast, or the absence of it, creates visual excitement (Figure 7.1).

The Figure 7.1 Original has "ideal" contrast properties: black is rich black, none of the whites are blown to pure white, so they retain the highlight detail enriching the photo, and while the tonal transitions are smooth, there is enough tonal differentiation between the image elements to sustain visual interest.

In digital imaging, including scanning, we can remap every tonal value in the image to be the same. The two images to the right of the Original show the progression in that direction, almost to the point where one's ability to distinguish anything disappears. The "Reduced Contrast" version would rate as a poor photograph, and

the "Zero Contrast" version is there just to make the point about why, absent colour, we need contrast to see anything.

7.2 Luminosity Adjustments in SilverFast

All the luminosity adjustments we make in SF8, except for two, involve remapping pixels from being lighter to darker, or vice versa, until we have achieved the brightness and contrast we consider appropriate for the image.

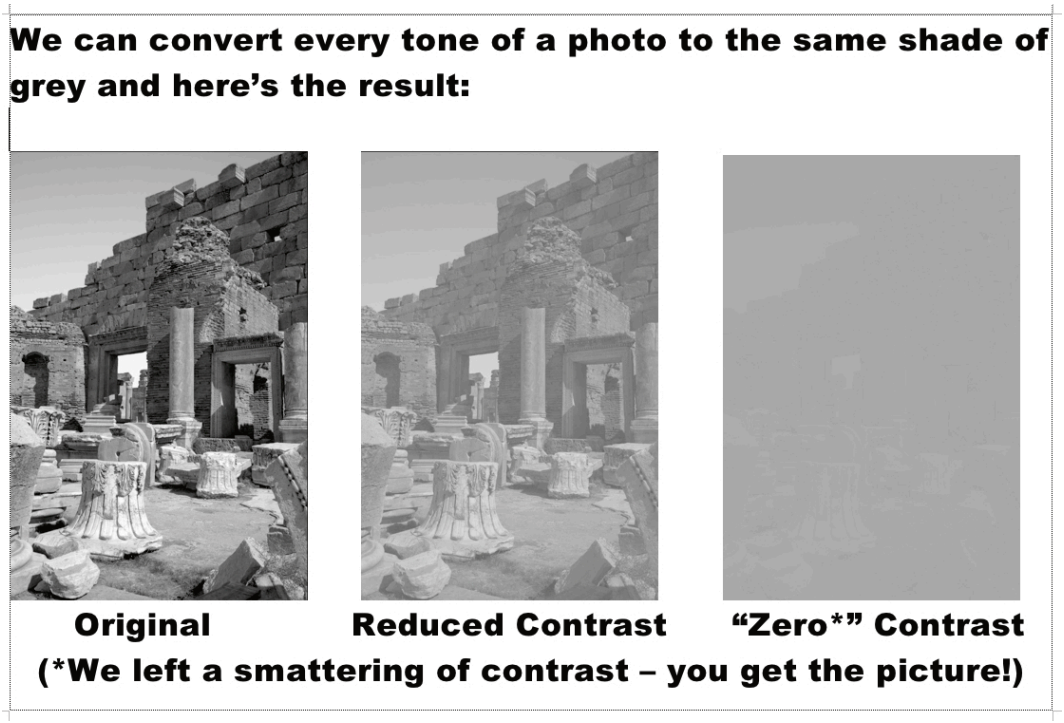

We can convert every tone of a photo to the same shade of grey and here's the result:
Original
Reduced Contrast
"Zero*" Contrast
(*We left a smattering of contrast – you get the picture!)

Figure 7.1 Contrast

One exception is that some scanners allow for user control over "analog gain", which is the amount of light from the scanner lamp(s) to which the scanner CCD sensor can be exposed during the scan process. Its main advantage is that it can boost exposure of dark tones by increasing the light-generated signal to the scanner CCD sensor, thereby reducing quarter-tone scanner noise[28] as it increases the signal-to-noise ratio.

Analog gain can be achieved in two ways: increasing the brightness of the scanner lamp(s), or increasing the time light is allowed to hit the photon receptors of the sensor. Most analog gain controls work in the latter manner. Not many scanner models allow this control. SilverFast normally provides for it on supported scanners

[28] Scanner noise shows as blotchy coloured speckles, usually in the image quarter-tones. All scanners produce a certain amount of noise because of signal impurities. It becomes apparent when the signal-to-noise ratio is too low to cover it all up.

that allow for it. At time of writing it is supported on the Nikon 5000 in SilverFast Ai 6.6), but is under development for SF8. I shall up-date this section to explain the use of **Lamp Control** when the implementation is completed.

The other hardware-based control is SilverFast **Multi-Exposure (ME)**, which makes two scans of the same image at different exposures and blends them. The purpose of **ME** is to add exposure to the dense areas of positives and negatives, thereby revealing more usable image detail in the shadow areas of positives and the highlight area of negatives. I describe **ME** in Section 7.4.

Apart from lamp control and **ME**, most luminosity adjustments are made by remapping pixels in the software without changing the hardware exposure from its base setting in the scanner driver.

7.3 Visual Assists for Luminosity Adjustments

You have three visual assists for making these adjustments: the appearance of the image itself in the image preview window, two histograms and the densitometer. I first show the key characteristics of the visual assists, then turn to demonstrating the use of the luminosity controls.

Two conditions are necessary for making proper use of the image appearance on your display: firstly, your display must be calibrated and profiled to correctly show the tone values in the image file, and secondly, the tonal rendering of the software must also be consistent with other colour-managed software that you may use on this image for further processing and printing. Only you can assure the colour management of your display. SilverFast uses algorithms consistent with Photoshop and Lightroom; hence, with correct colour management described in Chapter Three, you should get consistency between these applications.

When people complain that their prints come out looking much differently (usually too dark) from how the photo appeared on their display, the most pervasive cause of this problem is an improperly calibrated and profiled display. Specifically if your display is too bright and contrasty, which looks great for gaming, it will incite you to darken the images, changing the file numbers accordingly and making them too dark for correct printing. Remember, the print is based on the file, not your display.

The histogram is a graphic portrayal of all the tones in the image (Figure 7.2)

The tonal range goes from black to white as you look along the graph from left to right. This horizontal axis is the total space for containing every tone value in the image, from a value of 0 (Black) to 255 (White), using an 8-bit measurement scale (the 16-bit measurement scale goes from 0 to 65535, but it is the same tonal distribution, just a whole lot more granular).

The shape of the histogram (vertical scale) shows the concentration of tones along the scale. The higher the peaks at any one position, the more of the photo's total tone values are located there. A concentration of tones to the left indicates a darker image (as in Figure 7.4) and a concentration to the right a lighter one.

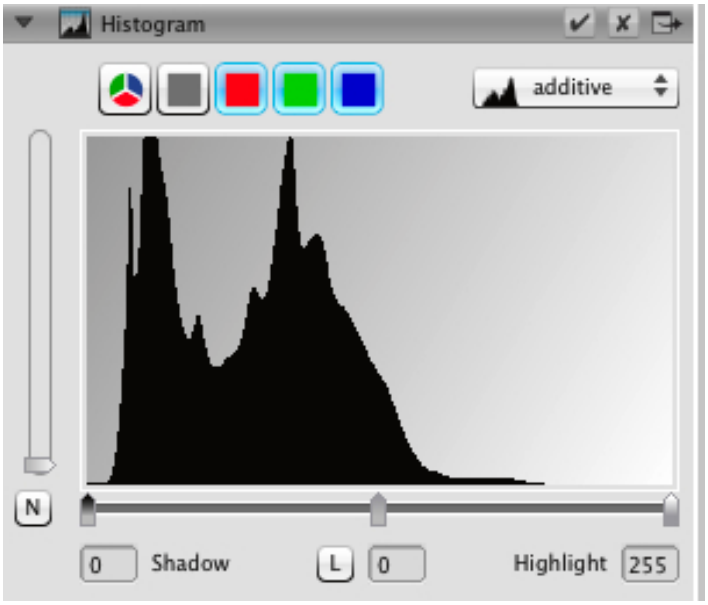


Figure 7.2 Histogram Tool (Input Histogram)

SF8 has two portrayals of the histogram: the output histogram in the **Picture Settings** panel (Figure 7.2a), the other being the input **Histogram** tool shown in Figure 7.2. They are integrated and serve slightly different purposes described below. The input histogram in the **Histogram** tool (Figure 7.2) shows the distribution of image tones along the scale before any adjustments are made, while the output histogram (**Picture Settings**, Figure 7.2a) shows the tonal distribution resulting from adjustments made in either **Picture Settings** or the input **Histogram** tool. When the latter is active, if you toggle with the ALT key, it shows alternatively the input or the output tonal distribution (before adjustments versus after adjustments). The controls in both panels are used for adjusting the image tonal distribution to make the image brighter or darker, or alter its contrast.

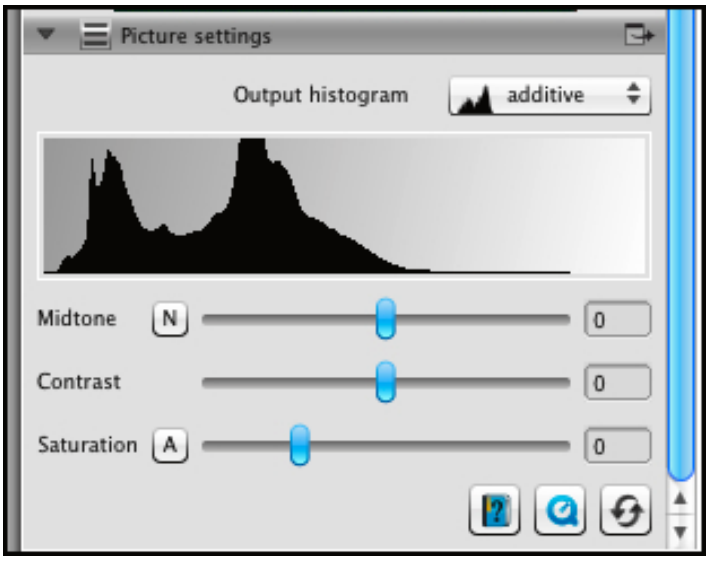


Figure 7.2a Output Histogram in Picture Settings

There is no necessarily correct distribution of tones along the scale of the histogram. Each image has its own distribution. But there are at least two critical characteristics of the histogram you should be mindful of: "black clipping" and "white clipping" (Figure 7.3, black and red arrows respectively). A "well-behaved" histogram has no tone clipping at either end of the scale (Figure 7.2), unless you do it on purpose.

Figure 7.3 Clipped Histogram

Evidence of tone clipping is visible when you see spikes of tones pressed up the left or right walls of the graph, or the tails of the histogram cut, indicating black or white clipping respectively (Figure 7.3). Clipping is generally not a good thing, because it means loss of tonal information: all tones below 0 and above 255 (or 65535 on the 16-bit scale) will be excluded and invisible. Hence to the extent feasible and appropriate to the image, when confronted with tone clipping, you should try to bring all the tones within the scale, except for specular highlights in which detail is not relevant. I'll show how later in the chapter where I explain how to use the histogram's editing controls.

An additional assist for evaluating tone and colour in you image is the **Densitometer**. This is a very useful tool for reading important tone and colour

information at the pixel level of the image. So I describe the Densitometer and its use here before moving on to discussing the use of the luminosity controls.

To access the Densitometer (Figure 7.4 in the Dock – I've surrounded it with a green box), click on the tiny triangle to the left of the Title of the Densitometer panel (Figure 7.4, blue arrow). Also click on the grad-cap for the **Expert Settings**. The readings are in the top part of the Densitometer panel.

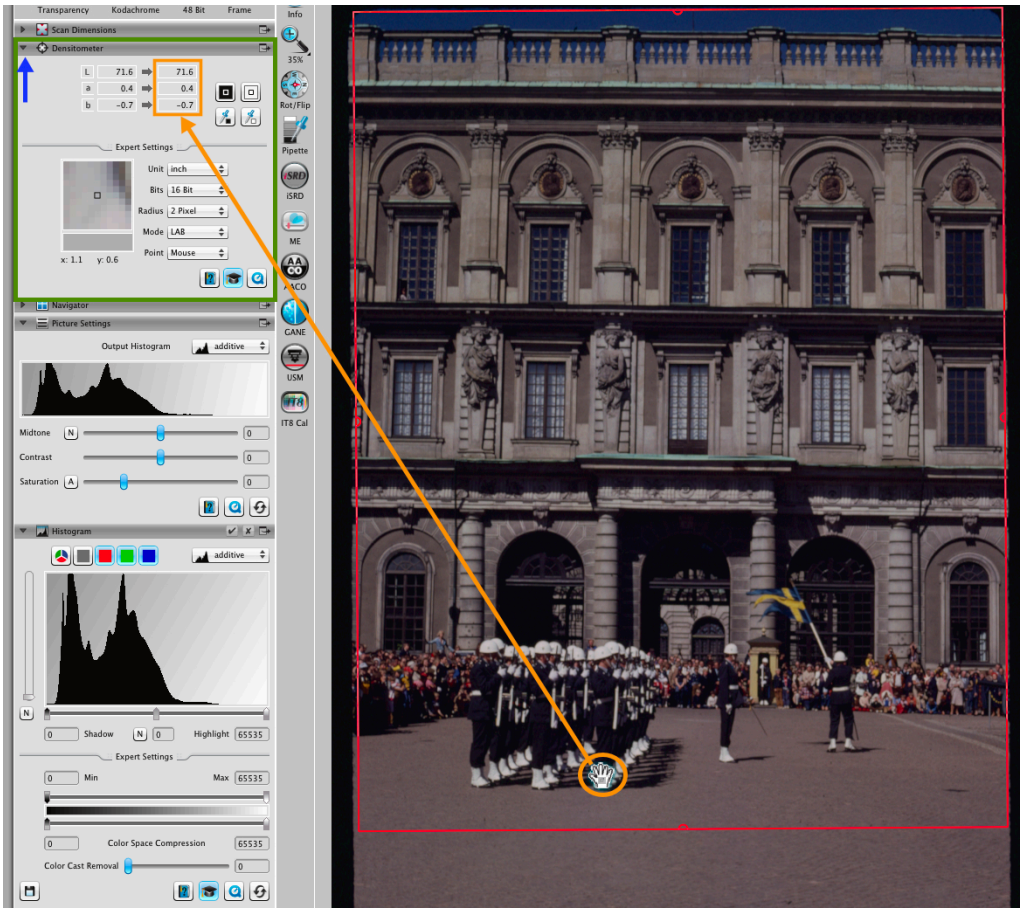


Figure 7.4 Densitometer Panel (green box) and Sample Image

I also recommend that you detach this panel from the dock and keep it located in a placed where you can easily look at it while you are making image adjustments.

To set-up the kind of readings you want, go to the **Expert Settings** and make the following choices by clicking on the dropdown menus for each item and selecting the option you prefer.

- For **Unit**, select how you want linear dimensions to be defined. I use "inch" as illustrated here.
- For **Bits**, the choices are 8-bit and 16-bit; setting it on 8-bit would be conventional if you are accustomed to reading similar scales in Photoshop. However, by setting it on 16-bit, and then floating and stretching the

Histogram panel across your display, you will get a very granular view of the image's tonal distribution (Chapter 1, Figure 1.7a). This scale has no effect on image quality; it is a scale for information purposes. SF8 adjusts the images in 48-bit depth regardless of whether the ultimate Scan Type is **48>24**, reducing it to 24-bits by the time it becomes a post-scan (output) image.

- For **Radius**, which affects the number of pixels whose values are read and averaged into a single measurement, you have a choice of 1 to 5 pixels. Normally, a setting of 3 is adequate to eliminate the influence of an outlier pixel in the area whose information you wish to read.
- For **Mode**, you have a choice, of RGB, LAB, HSL, LCH, CMY and CMYK. While RGB would be a standard choice for many users, I recommend LAB for the type of analytic information it provides. It separates tone from colour (**L** for luminosity and **a** and **b** for opponent colours), allowing you to see immediately the extent of non-neutrality in the selection under the cursor and whether its tint and temperature are on the warm or cool side of neutral. These readings are very helpful for making colour corrections, because these corrections always depend on adjusting between the colour being modified and its opposite, and this is the basis of the LAB colour measurement system. Please see Appendix 1 for more detail. The CMYK data will be useful for those scanning to pre-press, while HSL separates pixel data into its Hue, Saturation and Lightness components for those needing this information. I normally have my densitometer set on **LAB**. This is <u>not</u> a choice of the image colour format and editing space – it is only a choice of how colour and luminance information is reported.
- For **Point**, until you've set a Densitometer Point, the only available choice is your mouse, hence that is selected by default. Once you set a Point (up to four in SF8 Ai Studio) you can select these points as well.

Now, reverting to the upper part of the panel, hover your mouse over any part of the image you wish, and you will see the values of that pixel or pixel group show in the boxes. For example, if I hover over a whitish section of the image (I'm sure the boots of those Swedish soldiers are supposed to be white), and I'm in LAB mode, I may see a reading like a=0.4 and b= -0.7, telling me that this is very close to neutral, because when **a** and **b** both = 0, the tone is neutral (Figure 7.4, orange circle arrow and box).

You will notice in the read-out section that there are two columns of data separated by arrows pointing rightward. This is for showing the impact of adjustments you make on selected points in the image. To select a point for this purpose, hover your cursor over that point in the image and Shift-Click. You will see a white circle placed where you clicked (Figure 7.5) and immediately below it, or in the Densitometer panel info read-out, you will see the colour values (Figure 7.5, Lab **a** and **b** values in the right side panel). In this example, the pavement rendered mildly reddish, because the **a** value is greater than 0, while the **b** value is close to neutral.

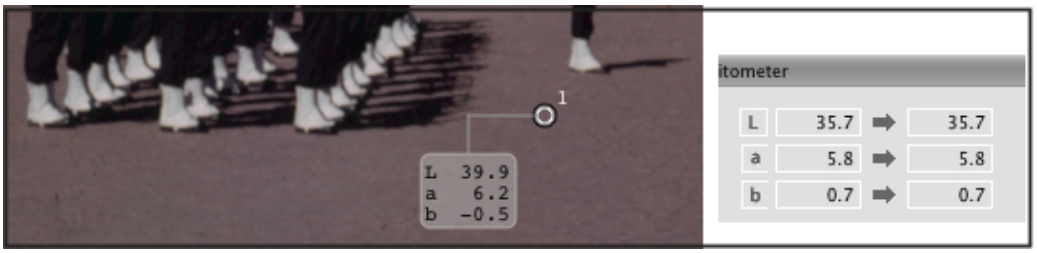


Figure 7.5 Point Lab Info

Now, adjust image tone or colour using tools described below (e.g., shifting the colour of the pavement more to gray) and hover your cursor over the same point. The left column preserves the values before you made the adjustment, while the right column shows the new values resulting from the adjustment. (Figure 7.6, where the proximity of the Lab colour values to zero in the right column confirms the pavement is very close to gray.) You may remove the point by Shift-Clicking on it.

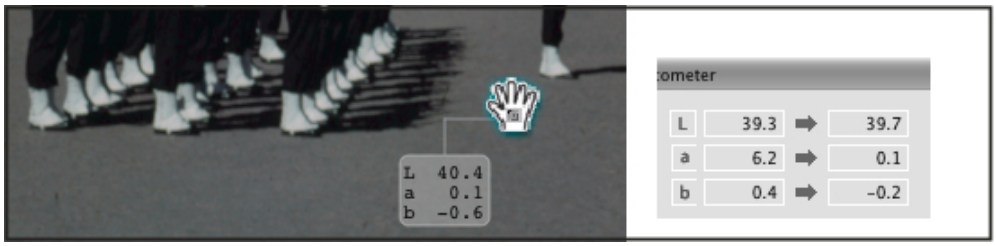


Figure 7.6 Adjusted Colour Point

But that is not all this panel does for you. The tool can identify the whitest and blackest points in the image by clicking on the little white and black icon eyedroppers to the right corner of the numerical read-outs. When you do that, the location and values of these pixels are shown on the image (Figure 7.7, red and orange arrows respectively). To delete them, Shift-Click on the points.

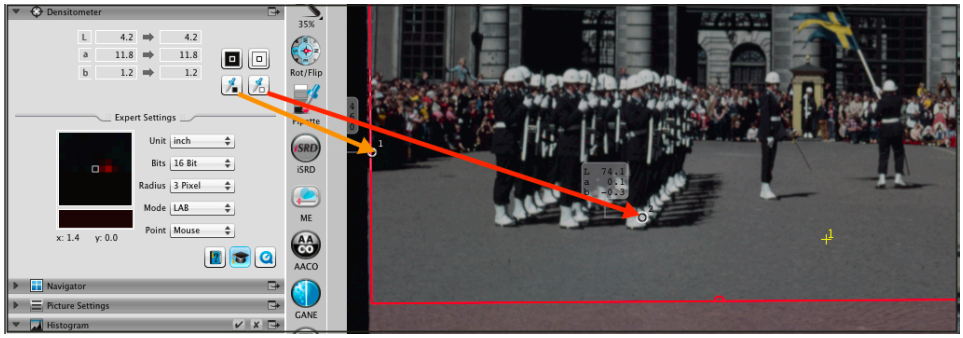


Figure 7.7 White and Black Point Identification

Notice the white and black boxes just above those eyedroppers. They are for momentarily exhibiting the lightest and darkest areas of the image. If you click on the Black square it will temporarily show in white, in the image preview, all the pixels sharing approximately the same tones of Black (Figure 7.8).

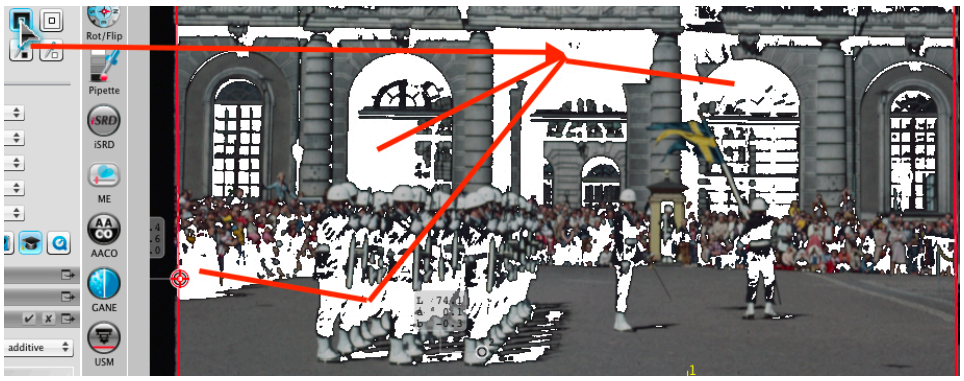


Figure 7.8 Black areas identification

If you click on the White Square, it will temporarily show in black all the pixels sharing approximately the same tone of white. These visual clues give you added insight to the tonal structure of the image, along with what you see more generally in the histogram. You can set and remove a Densitometer reading at exact points within the image by toggling **SHIFT CLICK**. So the Densitometer is a good measuring device, but it does not make any adjustments to the image. For that I now turn to the luminance adjustment tools.

7.4 Making Luminosity Adjustments in SilverFast

There are four software-based luminosity controls in SilverFast: the **Picture Settings** Panel, the **Histogram** Panel, the **Gradation** Panel and the **AACO** tool (Automatic Adaptive Contrast Optimization). Some of these functions overlap, and there is a measure of integration between them. The hardware-based luminosity controls are lamp-control (some scanners) and **ME (Multi-Exposure)**.

I have introduced the informational roles of the two panels containing the histogram, but not yet mentioned **AACO** and the **Gradation** curve. **AACO** is a method of lightening deep shadow areas to reveal more of their content.

The **Gradation** curve is without a doubt the most versatile tool for adjusting the luminosity of a prescan. Unlike the histogram, in which luminosity adjustments are confined to three points, the **Gradation** curve can be fine-tuned across the whole tonal scale in a targeted manner. It is very much like **Curves** in Photoshop.

I turn to demonstrating the use of each tool's controls in SF8, other than **Lamp Control**, not yet available.

(i) The Picture Settings Panel (Output Histogram, Figure 7.9)

This panel is available in **Ai Studio** only. It does not have an **Expert** dialog. You just need to become an expert at using what's there!

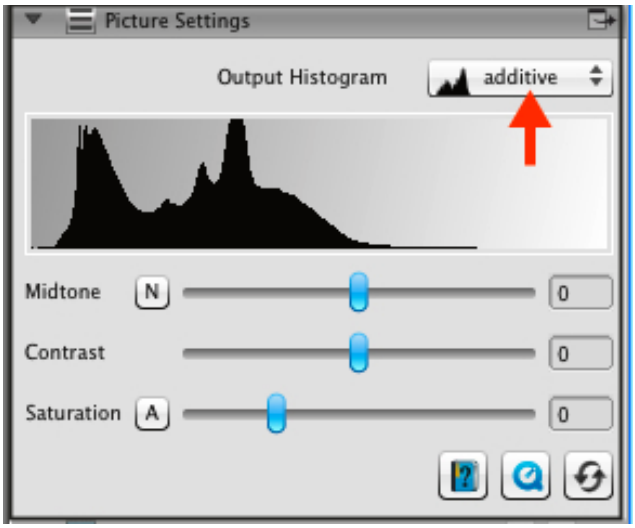


Figure 7.9 Output Histogram (Picture Settings Panel)

Figure 7.9 shows a "well-behaved" histogram (of the image in Figure 7.4), in the sense that no tone values are clipped at either the dark or light end of the tone scale. The predominant characteristic of the image is that it's dark, as you can see from the weighting of the tonal information toward the left (dark) side of the scale.

In its default view, you see a black histogram. But the image is an RGB image, composed of the colour values from each of the RGB colour channels. By clicking on drop-down menu to the right of **Output Histogram** Figure 7.9, red arrow), you can select the **Separate** or **Transparent** views (Figure 7.10; Transparent – left; Separate - right).

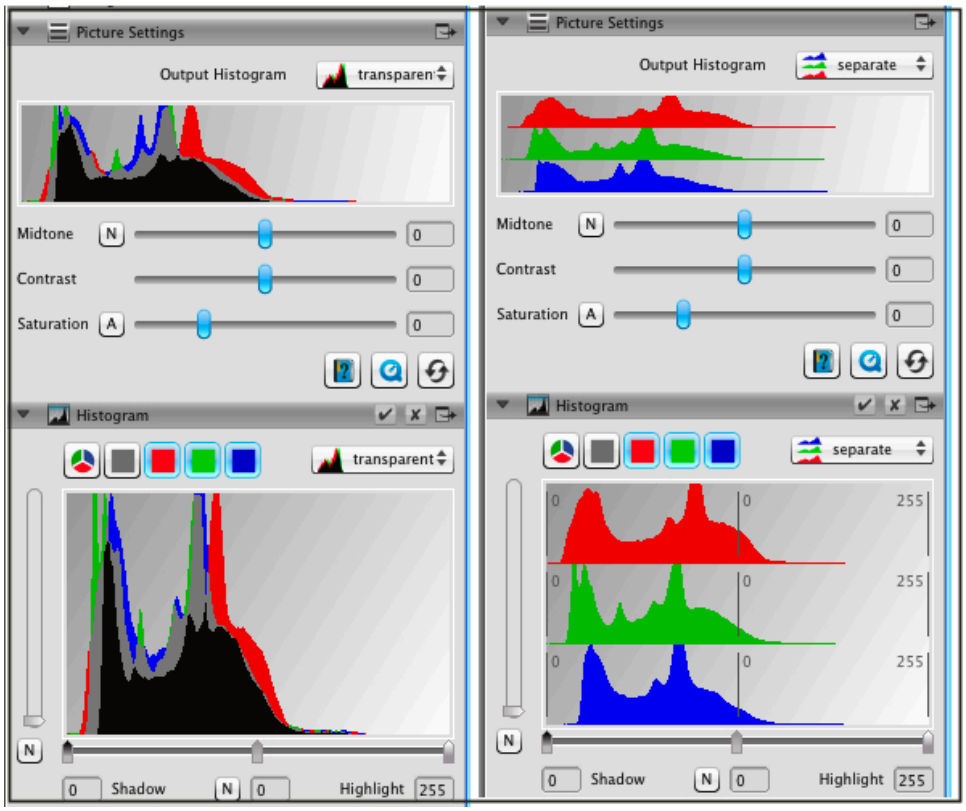


Figure 7.10 Histograms – Alternative Views

I prefer the **Separate** view, because it provides the most unambiguous view of whether any tonal information in any of the colour channels is being clipped. In Figure 7.10 I reproduced both the **Output Histogram** (upper) and the **Histogram** tool (lower) to show that before you make any image adjustments they have the same shape (but in **Picture Settings** the vertical scale is more compressed).

The **Midtone** slider is the first one under the graph of the **Output Histogram**. Like its name says, it adjusts mid-tone brightness. Sliding it to the right brightens the image and sliding it to the left darkens it (Figure 7.11, lower and upper respectively). This affects a broad range defined as mid-tones, but hardly moves the black or white end-points. Its strength can be increased by clicking on the button beside the word **Midtone,** which toggles **Normal** or **Logarithmic** adjustment. The latter produces a stronger impact.

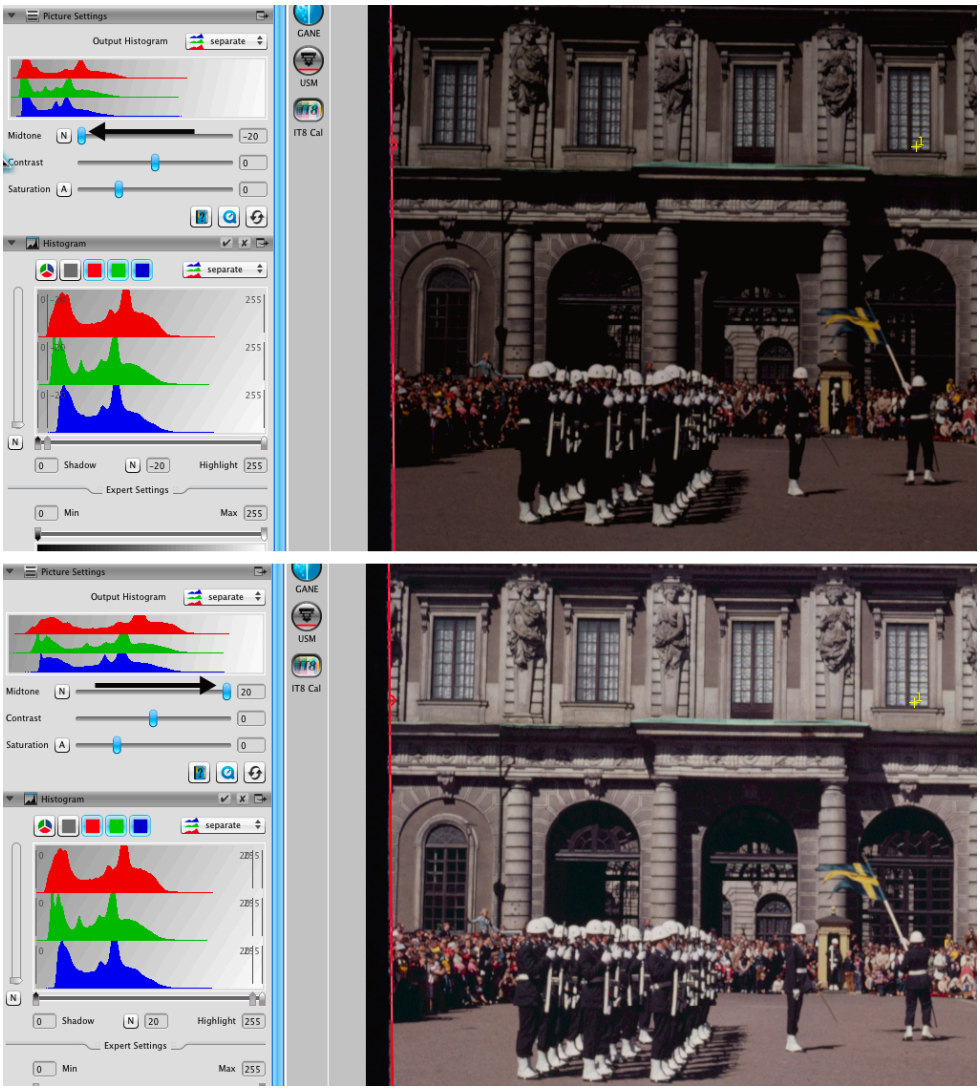


Figure 7.11 Midtone Brightness Minimum and Maximum

The contrast slider is a more potent adjustment, because it can have a greater impact on the overall distribution of tones along the tone scale. Sliding it to the left decreases contrast and sliding it to the right increases contrast (Figure 7.12, top panel where contrast is decreased versus middle panel where contrast is increased and the whole image looks so much "snappier"). If you increase contrast excessively using this slider, there is a risk of losing shadow and highlight detail, as increasing contrast compresses the tonal range, moving near black tones closer to black and near white tones closer to white – tones that would otherwise be shades of gray..

Because this image was naturally dark, I increased mid-tone brightness before applying contrast edits. The overall brightening protected the blacks when I increased contrast, hence the dark (left) end of the histogram did not "bunch-up" toward the left side.

Now, when you increase contrast, there is a tendency for colour saturation to increase. The image in Figure 7.12 is a nice one for showing this, because it most likely has a colour cast – I don't think the road was actually as red as the contrast boost in Figure 7.12 middle panel reveals. Just below the **Contrast** slider in **Picture Settings**, there is a **Saturation** slider allowing you to correct inappropriate saturation. By shifting this slider leftward, I reduced saturation, such that the natural grayness of this image indeed looks like a more credible gray (Figure 7.12, lower image). (Normally one would deal with colour casts in other ways described in the next chapter, but for this image, simply reducing saturation worked well!)

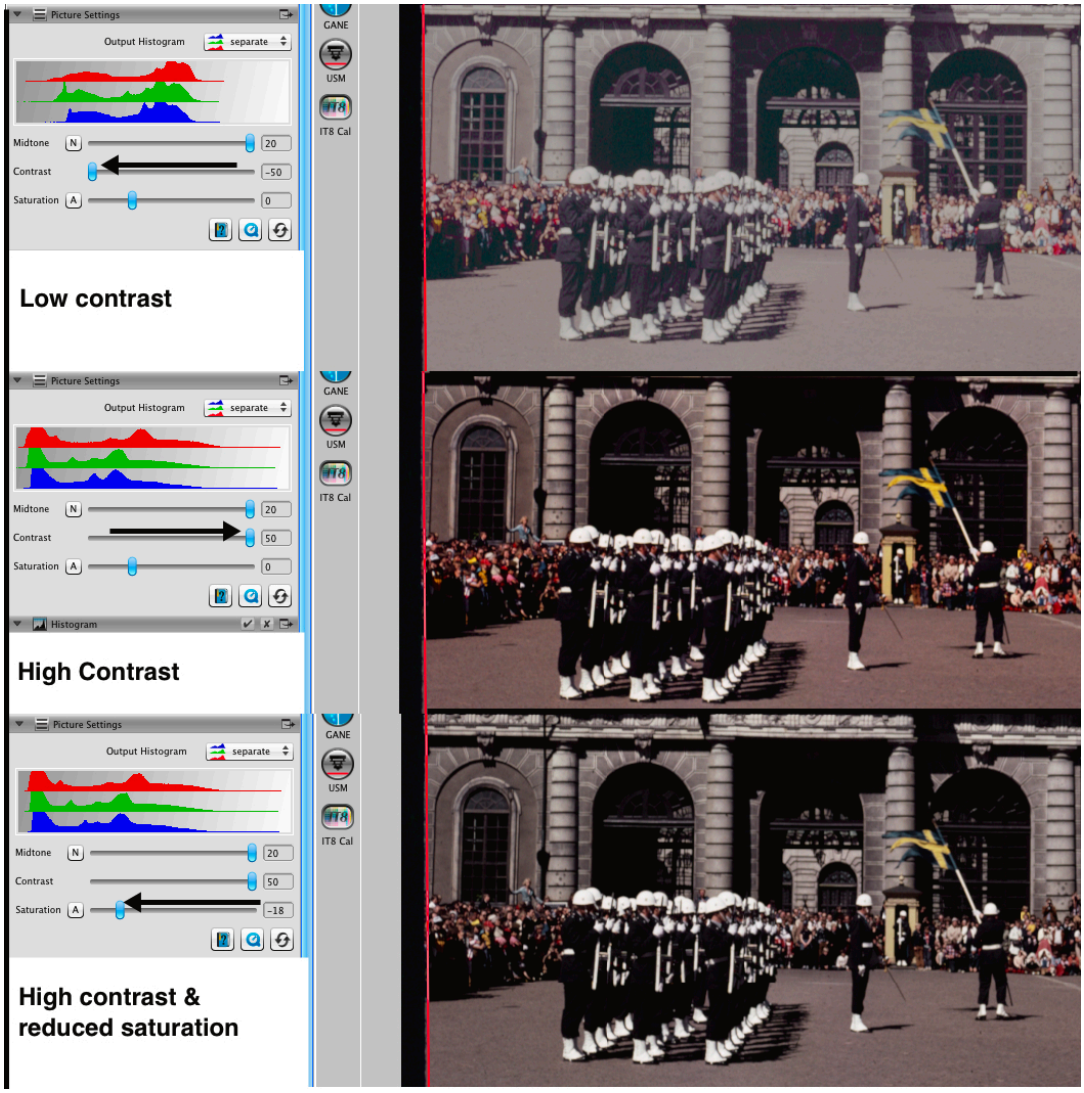


Figure 7.12 Contrast and Saturation Edits

The midtone brightness and contrast controls are integrated with the **Gradation** curve, in the sense that they move the curve according to the nature of the adjustments made. We'll see that when I discuss the **Gradation** tool.

(ii) The Histogram Panel

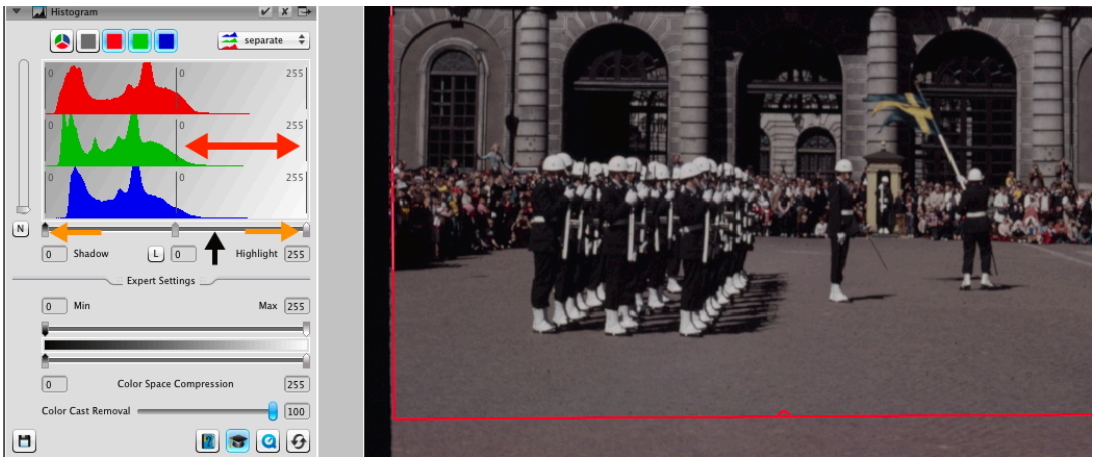


Figure 7.13 Histogram Panel – Default Settings

Figure 7.14 Improved Contrast – shifted end points

The **Histogram** panel (Figure 7.13) gives you additional control over image tones. Once again, I recommend clicking in the upper right drop-down menu above the image of the histogram and selecting the "Separate" view by clicking on it. This provides visual insight into the behaviour of the individual colour channels as you make adjustments. It could also come in handy for colour control I discuss in the next chapter. The far left vertical slider scales the histogram – no editing function.

When the histogram is in **Separate** view, there are three thin black movable vertical lines in each channel – one each at the black end, white end and mid-point of the histogram, (those, for example, pointed to with the red arrows in Figure 7.13). In this chapter I will not move them individually, because doing this affects colour balance, and that is the subject of the next chapter.

The key control in this panel is the set of sliders underneath the histograms (Figure 7.13, black arrow). Here, the luminosity levels are numbered in the end boxes, starting with 0 for black and ending at 255 for white (the densitometer being set at 8-bit for these figures). The numbering for the middle slider is an arbitrary scale stretching from **-30** to **+30**, **0** being the mid-point default setting. This control also

has the same kind of **Normal** and **Logarithmic** toggle switch I discussed above in relation to the Output Histogram.

Pulling the end sliders (Figures 7.13 and 7.14, orange arrows) inward increases image contrast by compressing the tonal range (values that are less white become more white and values that are less black become more black). If you pull these sliders inward up to the point that they coincide with the beginning of the tails of the histogram (Figure 7.14), you will not clip any image data. If you pull them in so that they encroach on tonal values in the histogram, you will lose image data.

In Figure 7.14, I moved the black point from **0** to **8** and the white point from **255** to **200**. This remaps the whole image darker, and in particular, it means that all the tonal distinctions between levels **0** and **8** have been compressed and remapped to zero, such that nothing up to level **8** is distinguishable. It's all black. (But that's OK, because there was extremely little between **0** and **8** to compress, hence it was a remapping from a weaker to a denser black starting point, increasing contrast. Likewise, at the white end of the scale, I moved the white point from **255** to **200**. By doing this, I've compressed all the levels from **200** to **255** and remapped them as white, suppressing all highlight detail these levels may have contained; but in this image there are none, so nothing lost. The result is more contrast.

When starting with an under-contrasted image in which there is considerable empty space between the tails of the histogram and the default black and white points, pulling these two end-point sliders inward to the histogram tail ends would be the first luminosity adjustment to perform, as they would greatly improve the image contrast if that's what's needed. This is called "normalizing the histogram".

These end-point adjustments do not affect the **Gradation** curve (discussed below), because the end points of that curve are immobile in the direction of change that would be needed.

Turning to the center slider, this adjusts the midtones, identically to the midtones slider in the Picture Settings Panel. Sliding it rightward brightens the midtones and leftward darkens them, leaving the black and white tails of the histogram unaffected.

In SF8 **Ai Studio**, the **Expert Settings**, accessed by clicking the button with the grad cap, has two controls. The one for **color space compression** is used to fade the image for overlaying text. Moving the sliders at either end compresses the color space, weakening image contrast significantly. It is used for the purpose intended, and not as a general tonal adjustment tool.

The **Color Cast Removal** slider (bottom of the panel, Figure 7.13 left) is used to mitigate a colour cast. If you observe a colour cast, shift the slider and observe how the colour cast gets reduced.

(iii) Gradation Panel

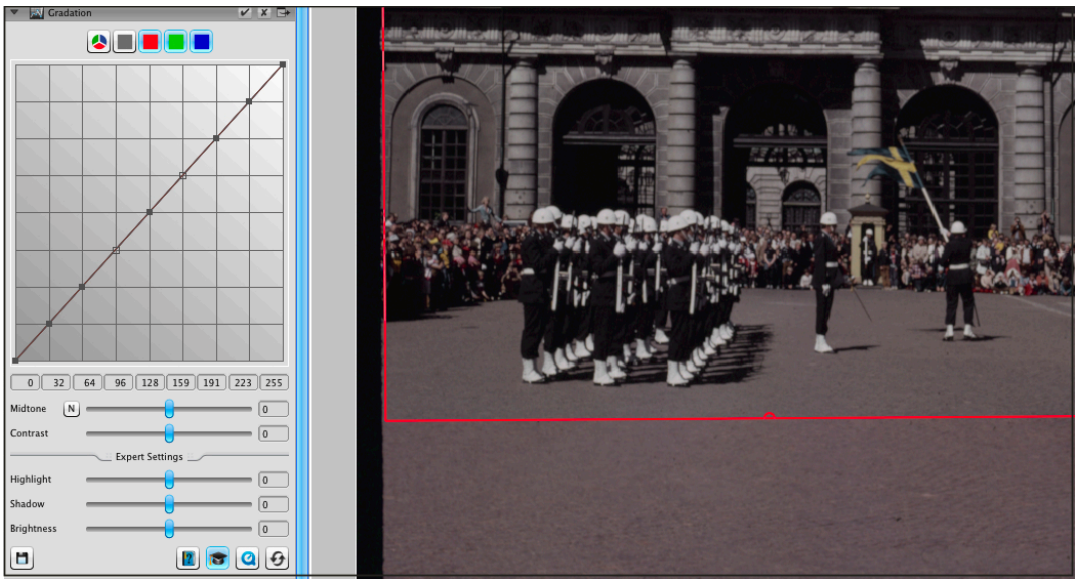


Figure 7.15 Gradation Curve, Default Settings

Like the histogram, the **Gradation** tool has a horizontal scale going from black to white (left to right respectively) with 0 being black and 255 being white (Figure 7.15, the numbers under the graph). In 16-bit computing, the scale really goes from 0 to 65,536, but this is far too much detail to show on the interface, so the 8-bit scale is used for display purposes even though under the hood, image adjustments will be performed in16-bit. This horizontal scale is the Input scale. It represents the tonal information in the photo before any adjustments are made.

The vertical scale South to North, left side of the graph) is the Output scale, representing remapped tone values once you start making adjustments to the input values.

A straight line angled at 45^{σ} relates the Input scale to the Output scale. All the tone values displayed in the histogram can be arrayed somewhere along this line, the exact place being at the corresponding value on the input scale. For example, the exact middle of the line is the place for all tones having a middle gray value of 128 on the horizontal Input scale. Because the line is presently linear at 45^{σ}, the Output value maps as the same number on the vertical Output Scale (where no actual numbers show).

Now, the great thing about this tool is that you can bend this line (that's why it is called a "curve") for the purpose of converting given Input values into different Output values, thereby adjusting the luminance of the image from where it begins to where you want it.

For example, grab the middle point of the curve (level 128) and move it upward – for sake of illustration - to the next higher grid-line. By doing this, you've remapped all tones that had a value of 128 to now have a value of 159. You can read the remapped value information from the row of numbers immediately underneath the graph – and look at the photo – the mid-tones are brightened (Figure 7.16 compared with Figure 7.15).

Figure 7.16 Mid-point Boost

This remapping also affects neighbouring tone values, on purpose, to prevent very abrupt transitions from creating posterized or banding effects in the image. For example, the tone value on the grid line immediately to the left has changed from 96 to 114, and the one immediately to the right from 159 to 177 (Figures 7.15 and 7.16 compared).

There are three "cardinal rules" governing the use of the tone curve.

1. Steepening any portion of the curve increases image contrast along that range, while flattening it reduces contrast.
2. Transitions between steepening and flattening matter. If the transitions between steepening and flattening are too abrupt, strange and unwanted impacts on the image can occur, the remedy being to smoothen the transition between the contrast ranges by adjusting the curve points (up or down or left or right) so that the slopes between steeper and flatter ranges are more similar.
3. Shifting a curve point leftward or upward increases brightness, while shifting it rightward or downward reduces brightness.

Once you practice these three basic principles of using the **Gradation** curve, you'll make successful tonal adjustments. Illustrations of contrast-enhancing and contrast-reducing curve shapes are shown in Figure 7.17. (The starting point is Figure 7.15 before any contrast or brightness enhancements are performed.) The upper image is contrast-enhanced, as you can see from the image and the steeper slope of the curve (compared with the red 45 degree line) between the points demarcated with red arrows. The bottom image is contrast reduced, with a flatter curve (relative to

the 45 degree line) between the red arrows. In the middle section, both Contrast and Midtone brightness are increased.

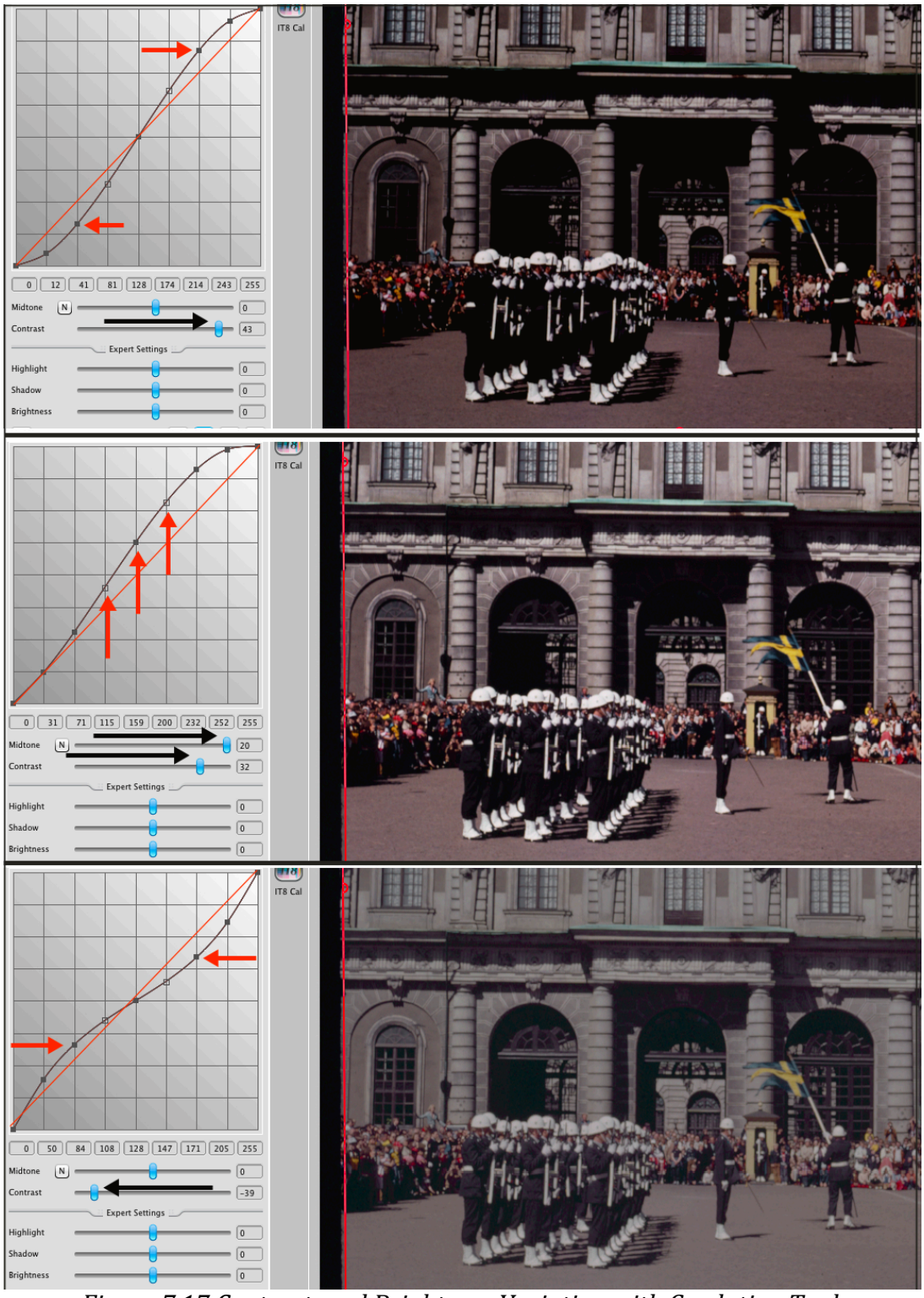


Figure 7.17 Contrast and Brightness Variation with Gradation Tool

To simplify making these adjustments and to protect against overly abrupt tonal transitions, SF8 provides a number of curve adjustment controls under the graphic interface. In the **Ai Studio** version you get a total of five, in the **SE+** version, two.

The two included in all versions are **Midtone** and **Contrast**. They do exactly as named. The **Midtone** control (Figure 7.17 middle) gives you the option of Normal (N) or Logarithmic (L) adjustments by clicking on the button immediately to the left of the slider. The (L) adjustments have stronger impacts than (N) adjustments. Moving the slider leftward decreases midtone brightness, while moving it rightward increases it, as I've done in the middle image of Figure 7.17.

The **Contrast** slider does not have an (N) or (L) option. Moving this slider rightward increases image contrast, while moving it leftward decreases it (Figure 7.17, top and bottom panels, black arrows). I recommend making these adjustments with care. It is worthwhile keeping the Output Histogram (Picture Settings panel) open and just above the Gradation curve so you can see what happens to the image's histogram as you adjust the gradation curve (figure 7.18).

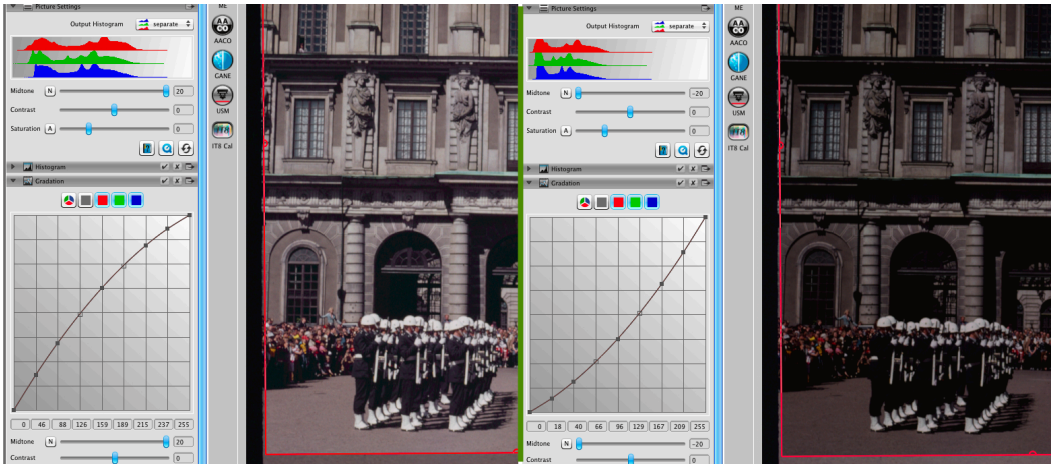


Figure 7.18 Curve plus Histogram; Bright and Dark

You can see in Figure 7.18 how the curve is shifted downward and the histogram leftward in the dark image (right side), while the curve is shifted upward and the histogram more centered in the brighter image (left side).

Moving down to the controls in the **Expert Settings** (**Ai Studio** version), there are three: **Highlight, Shadow** and **Brightness**. The **Highlight** and **Shadow** sliders target those specific areas of the curve; they are recommended when you need highlight and shadow adjustments without very much impacting the midtones. These adjustments do have some impact on midtones – this is inevitable to prevent posterization or banding, but much less than if it were the midtones being adjusted to a similar extent.

Figure 7.19 Highlight and Shadow Curve Adjustments
***Upper Panel**: Unadjusted; **Lower Panel**: Highlights and Shadows Lightened*

You reduce highlight brightness moving the **Highlight** slider leftward and increase it moving the slider rightward (Figure 7.19, lower panel, red arrow). I suggest keeping your eye not only on the image, but also on the Output Histogram, when making these adjustments.

You increase shadow brightness moving the **Shadow** slider leftward (Figure 7.19 lower panel, blue arrow) and decrease it moving the slider rightward.

The **Brightness** slider broadly influences image brightness across the range. Shifting it rightward increases brightness (Figure 7.20, red and blue arrows), while shifting it leftward decreases brightness. It can cause major clipping of highlight or shadow detail when pushed too far. Watch the image and the Output Histogram for evidence of this happening (Figure 7.20, black oval and arrow). LaserSoft Imaging recommends not using this control except as a Line Art threshold or for extreme artistic manipulations.

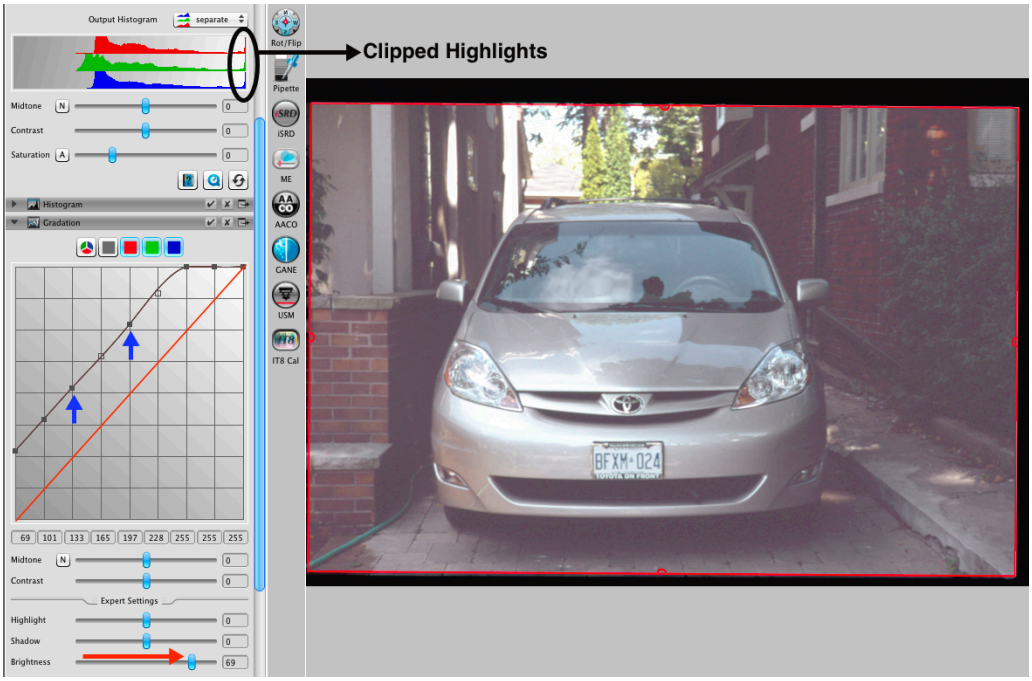


Figure 7.20 Excessive Brightening

Using the sliders is one convenient way to adjust image luminosity. However you are not confined to that. You may move the position of the curve manually by using your mouse to grab and drag any of the nine points on the curve and reposition them in a manner that you think best suits the needs of the image.

In SF8 Ai Studio, if you wish to apply the same settings to a number of other images, you can do so by clicking on the "Save" icon (lower left corner of the panel). A window will pop-up asking you to give the settings a name. When done, click on OK. You may then load this group of settings for other images by clicking on the same icon, and selecting the appropriate title from the list that appears. The items in bold are SilverFast presets.

To reset all Gradation curve settings, click on the lower rightmost button in the Gradation panel. This is not an "undo" of the last step made. It resets all settings in this panel to default positions.

Finally, I note the RGB colour buttons at the top of the graph. These activate the individual RGB channels. Shifting these curves affects the colour balance of the image, discussed in the next chapter.

(iv) AACO (Auto-Adaptive Contrast Optimization)

AACO works primarily on areas of the image that you designate as "shadow areas", the purpose being to open-up shadow detail that may be otherwise smothered by excessive contrast. Click on its icon to open it in the Dock (figure 7.21, red arrow).

AACO is not connected with the Input histogram and has no bearing on the shape of the Gradation Curve. Hence, the adjustments you make with this tool are guided only by what see you see in the image. I suggest recourse to this tool if you fail to achieve satisfactory opening-up of the lower quarter-tones using the Histogram and Gradation curve controls.

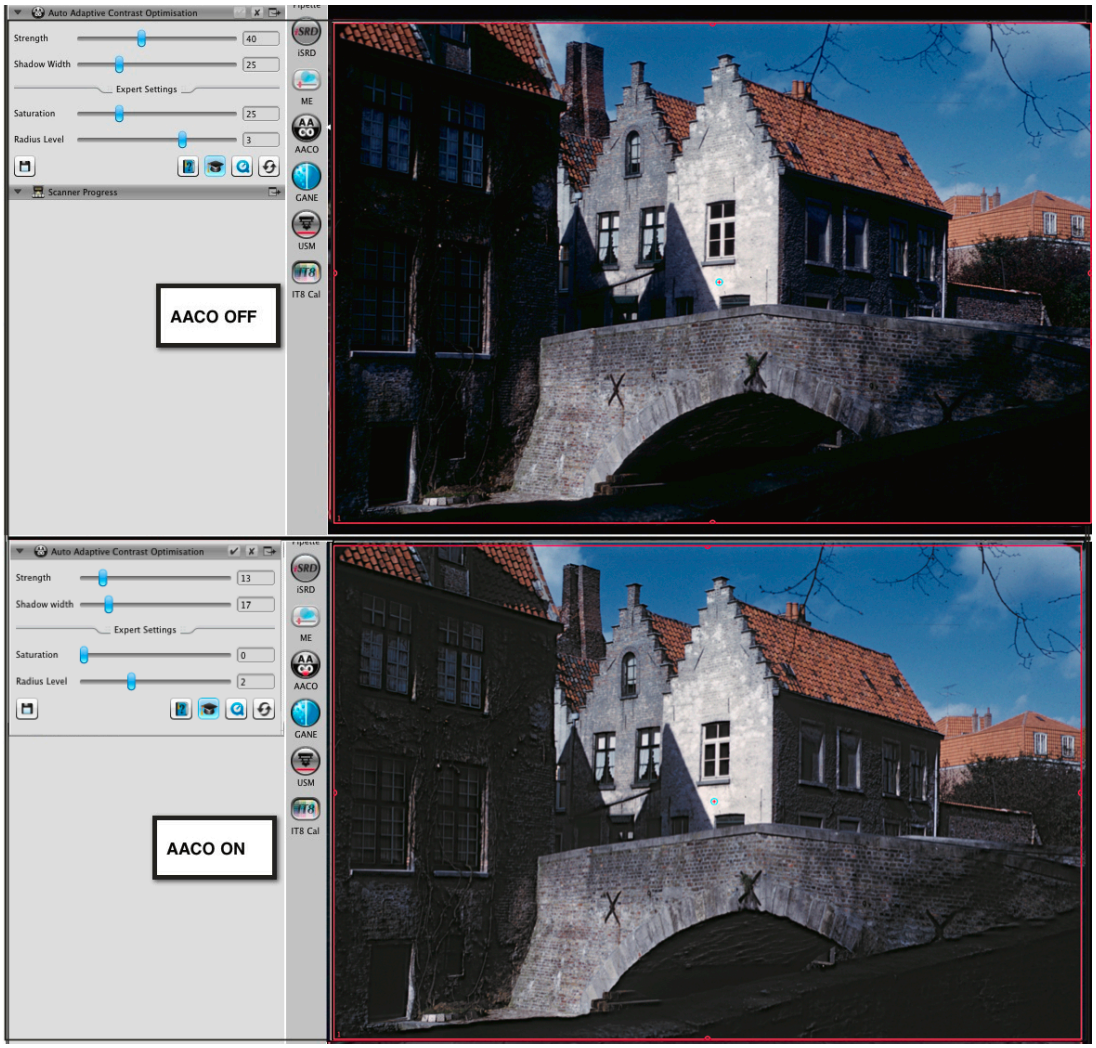


Figure 7.21 AACO Effects;
***Upper**: Shadows Unadjusted;*
***Lower**: Shadows Opened Subtly (left wall and under the bridge),*

The two main controls available in SF8 **Ai Studio** are **Strength** and **Shadow Width**. **Shadow Width** determines the range of dark tones that will be affected by adjustment to the **Strength**. If the **Shadow Width** were set to **0**, no amount of **Strength** would have an impact. To use this tool efficiently, I recommend starting with the default values and working between **Strength** and **Shadow Width** iteratively until you achieve the correct targeting of its effectiveness range and the strength of impact you think appropriate for the image. Moving the **Strength** slider

from left to right increases the impact. Moving the **Shadow Width** slider from left to right increases the tonal range affected by the Strength setting. I usually find it best not to push the effects of these sliders very far in order to achieve optimal results.

The **Expert Settings** (**Ai Studio**, click on the button with the grad-cap) opens a **Saturation** control and a **Radius Level** control. The impact of both also depends on the **Shadow Width**. With **Shadow Width** at **0**, none of these controls do anything.

Given some positive value for **Shadow Width**, as you shift the **Saturation** slider rightward, it increases the colour saturation of the image area determined by the **Shadow Width** position. This can add "body" to opened-up shadow areas. As you increase the **Radius Level**, it increases the separation of tonal values within the same area, but taken too far it will create dark halos between lighter and darker objects in the affected area. You would most probably want to avoid this. Excessive adjustment with this tool may impart a grayish cast to the image and open the shadows to a greater extent than may appear natural.

(v) Multi-Exposure (ME)

The purpose of Multi-Exposure is to literally shed more light on the dark areas of the original media (shadows in positives and highlights in negatives); this increase of exposure should achieve better separation of deep quarter-tone luminance values in positives and highlight detail from negatives, thereby revealing more image detail in those areas. At the same time, it increases the signal-to-noise ratio in the dark areas, mitigating the visibility of scanner noise in the darker areas of the image. Finally, the more exposed scan and the normal scan are blended into one composite, somewhat akin to a high dynamic range (HDR) operation, as it expands the total visible range of luminosity values. **ME** also replaces **Multisampling** (SilverFast 6) as it performs this noise-reducing function.

Using this control is very straightforward. You click on the **ME** button to activate it, and then perform the scan. **ME** will remain active until you de-activate it by again clicking on the **ME** button. There are no user-controllable settings within this function.

I provide an illustration of the **ME** effect first using a positive for seeing the effect on shadow values, and then using a negative for seeing the effect on highlight values.

You may preview the effect of **ME** if in **Preferences>Special** you have checked the box to the left of **Multi-Exposure Preview**. Having done so, when you toggle the **ME** button on, a dialog will pop-up saying "Not enough input images available for Multi-Exposure preview. Do you want to start additional prescan now?" When you see this, Click **Yes,** the additional prescan will happen and **ME** preview will be available by toggling the **ME** button on and off.

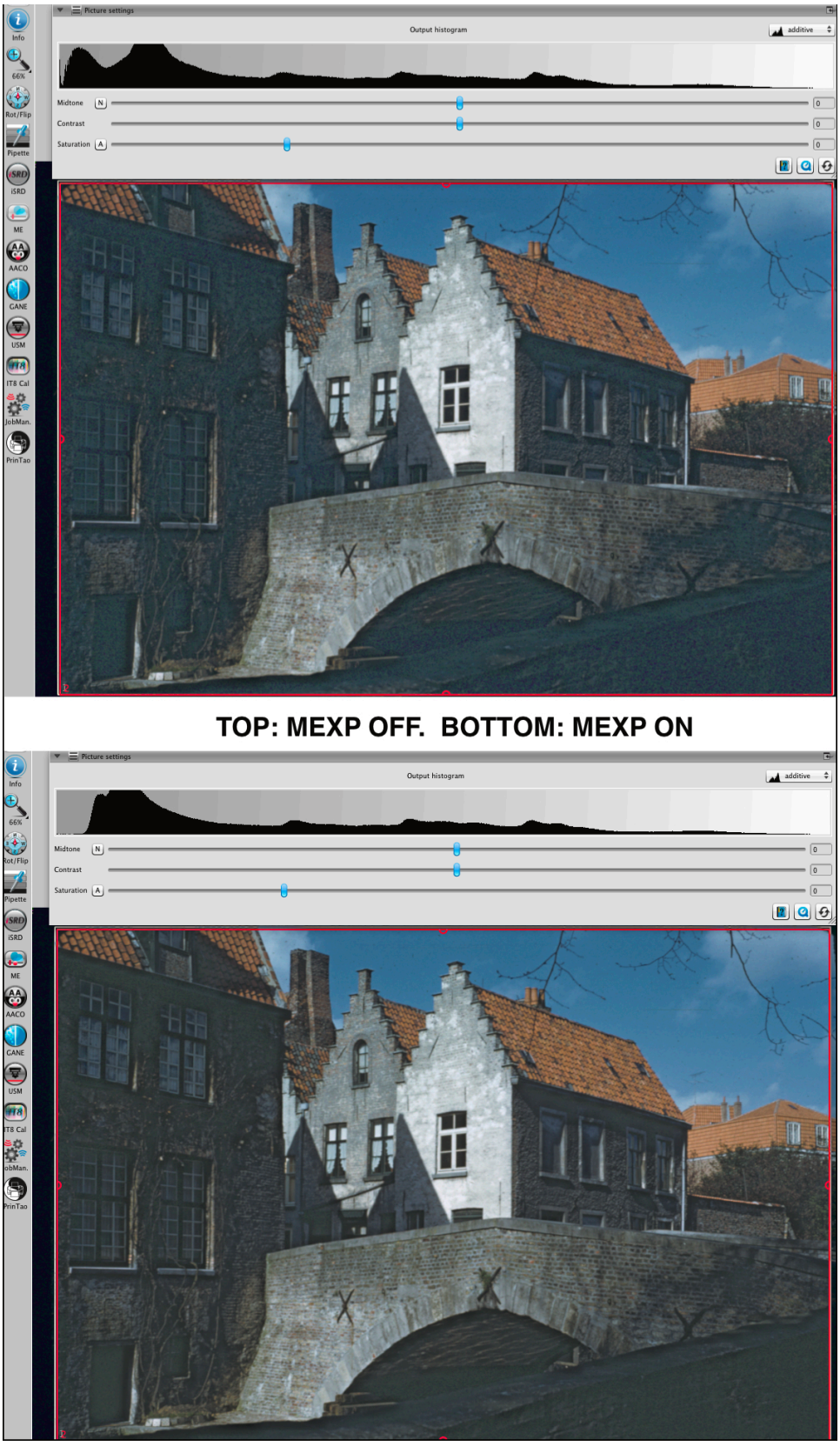


Figure 7.22 Multi-Exposure: Positive Transparency

The visual appearance of this effect is subtle. With **ME** on (Figure 7.22 bottom image), the dark end of the histogram is shifted slightly brighter on the tone scale compared with how it is positioned with **ME** off (Figure 7,22 top image). To better see the difference this makes to underlying image quality, I opened both files in Photoshop, applied an identical Curves Adjustment Layer to both for boosting the shadow tones substantially. The results show in Figure 7.23, a highly magnified view of the side wall and the water reflecting off the under-roof of the bridge over the canal; the top image with **ME** on shows better tone balance, less noise and more image detail than seen in the lower image of the same scan done without **ME**.

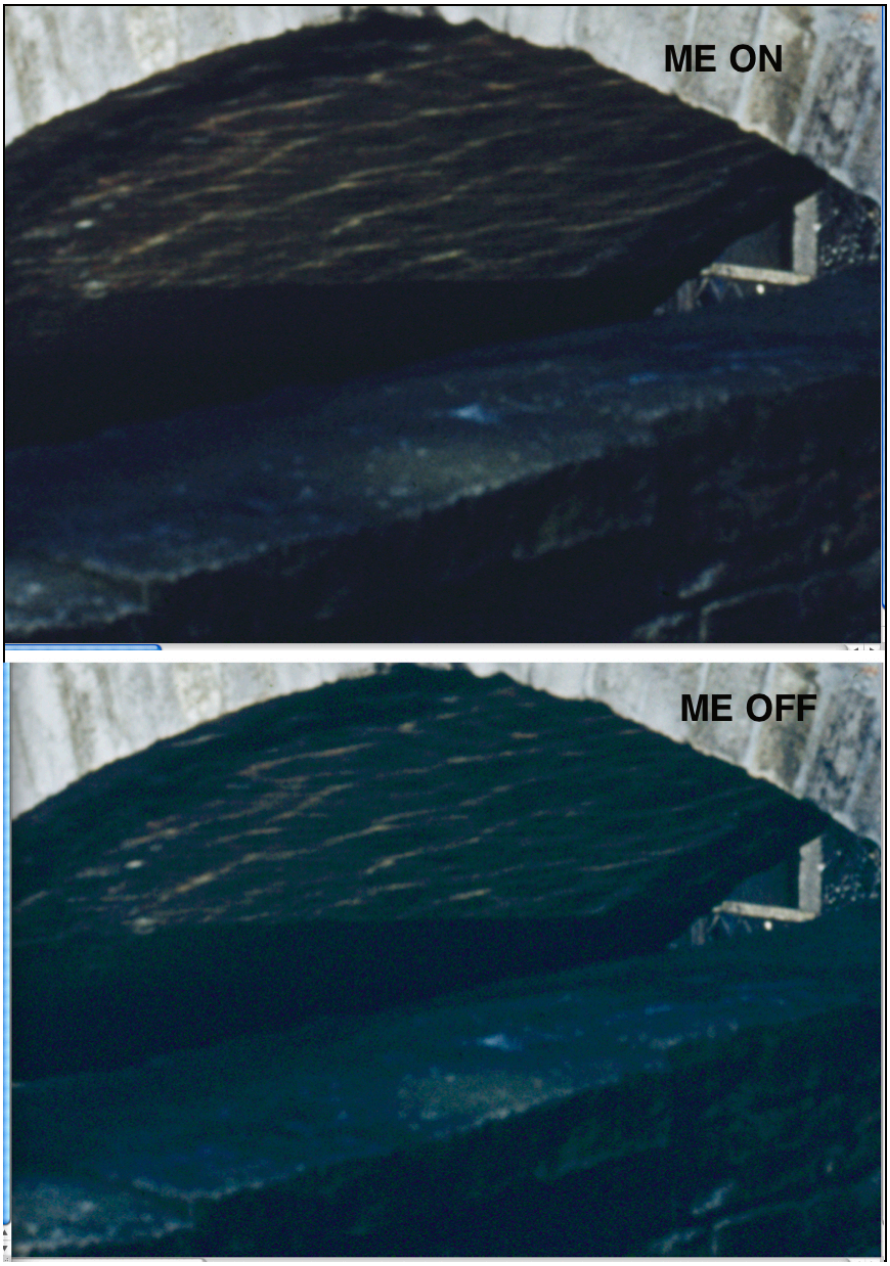


Figure 7.23 Impact of Multi-Exposure – Close-Up

I also provide an illustration of the impact of ME on highlights in colour negative scans.

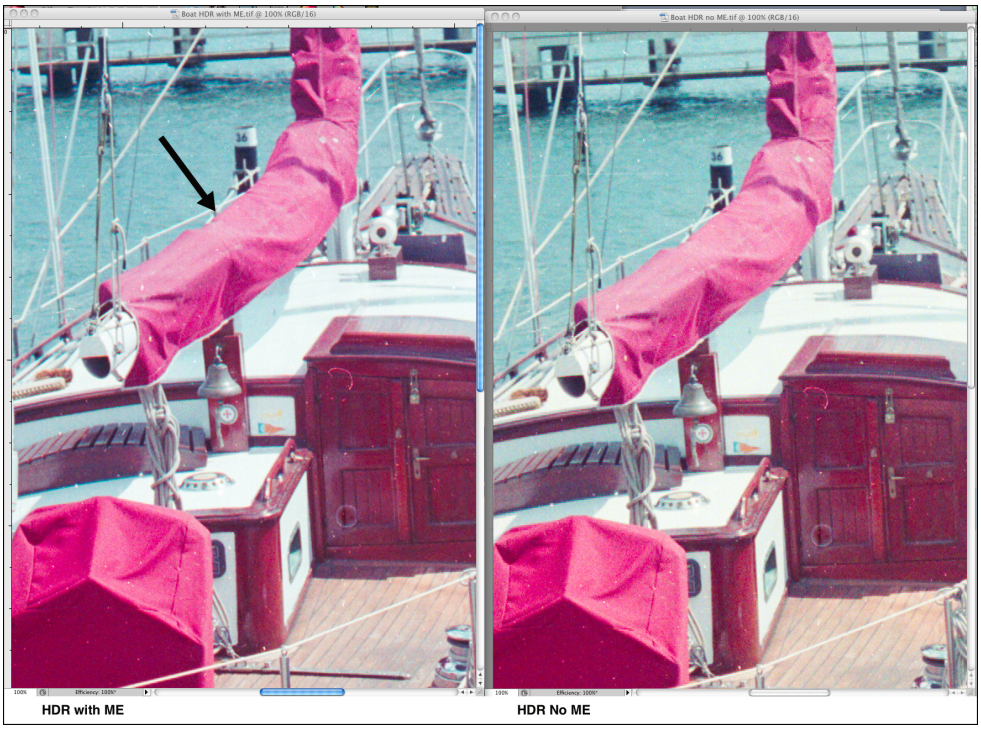


Figure 7.24 Multi-Exposure for Highlights of Colour Negative

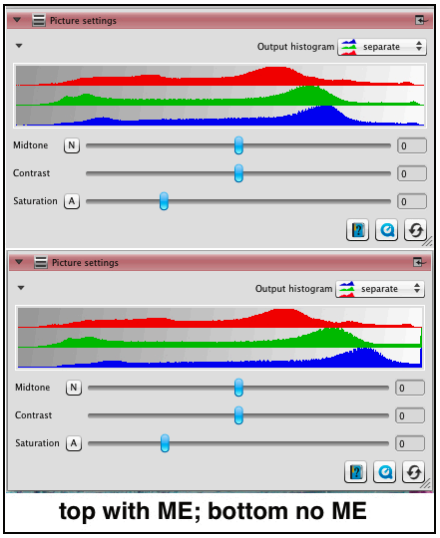


Figure 7.25 Histograms for Figure 7.24

In Figure 7.24, you may observe how the highlight detail in the mast cover (black arrow) is better preserved with **ME** than without it, and in Figure 7.25 how the highlights are not clipped in histogram with **ME**, but are clipped in the green and blue channels without it. Again, the impact is subtle, but real.

Finally, beyond SF8, all the software methods of adjusting luminance values I've discussed above are available in Photoshop and Lightroom; **ME** and **Lamp Control** are not, because they are scanner-dependent. I advise those who wish to confine most of their image-editing workflow to an external editor that at the very least it is helpful to normalize the histogram to the extent possible within SF8, because clipped information cannot be recovered in a post-scan workflow and the better the quality of the scan, the less subsequent editing will be necessary. I shall demonstrate luminosity adjustment in a post-scan workflow in Chapter Ten. Also, Appendix 5 has additional discussion about techniques for revealing shadow detail.

Chapter Eight
Colour Correction

Before you read about the various ways of controlling colour in SF8 which I describe below, I recommend that those of you not familiar with the concepts of colour spaces, colour values and colour relationships should first read **Appendix 1**. This background will help you to better understand the logic of the SilverFast colour correction controls covered in this chapter.

Photographs need colour correction if they show either a colour cast affecting all the colours, or particular colours not having the desired value, be it hue, saturation or lightness. In the special case of colour negatives, the colour values need to be reversed and the films have a mask (usually but not always an orange hue) that needs to be removed. I discuss processing colour negative images in Chapter Nine.

SF8 has four main ways of adjusting colour:

(i) Neutral Pipette
(ii) Global Color Correction
(iii) Selective Color Correction
(iv) Gradation and Histogram channels

You may use these tools alone or in combination.

8.1 (i) Neutral Pipette

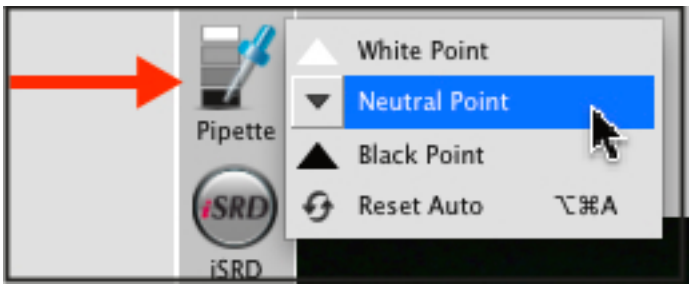


Figure 8.1 Neutral Pipette

This is my favorite way of adjusting an image in need of overall colour rebalancing. The underlying principle is that when all the colours in an image are off-balance, the imbalances are proportionate to the non-neutrality of tones that should be neutral. Hence this tool is configured to operate in a manner that once a tone that should be gray is rebalanced to become gray, all other colours will be shifted consistently, resulting in correct colour overall. For example, if a value that should be neutral has a cast of -2b* (in **Lab** values[29]) as in Figure 8.1a, which means slightly blue, the rest

[29] The **Lab** colour space is explained in **Appendix One**.

of the image would be slightly cool, so by correcting that value to 0a*, 0b* (gray in **Lab** values), this cast will be thereby removed from all the other colours as well.

There is one necessary condition for using this tool to advantage: an item in the original scene you photographed should be neutral (gray), regardless that it isn't in the photo. This condition is often more difficult to satisfy than you may imagine. Even stonework and road pavement that **seems** gray is not necessarily neutral gray in the reality of the scene itself. If you click this pipette on an area that you **think** should be gray but really shouldn't be, you can impair colour balance rather than correct it. You'll know right away when you see what happens to other familiar colours in the photo as you do this. You eventually become experienced at detecting points in an image that should be neutral. Gray hair, for example, is usually neutral.

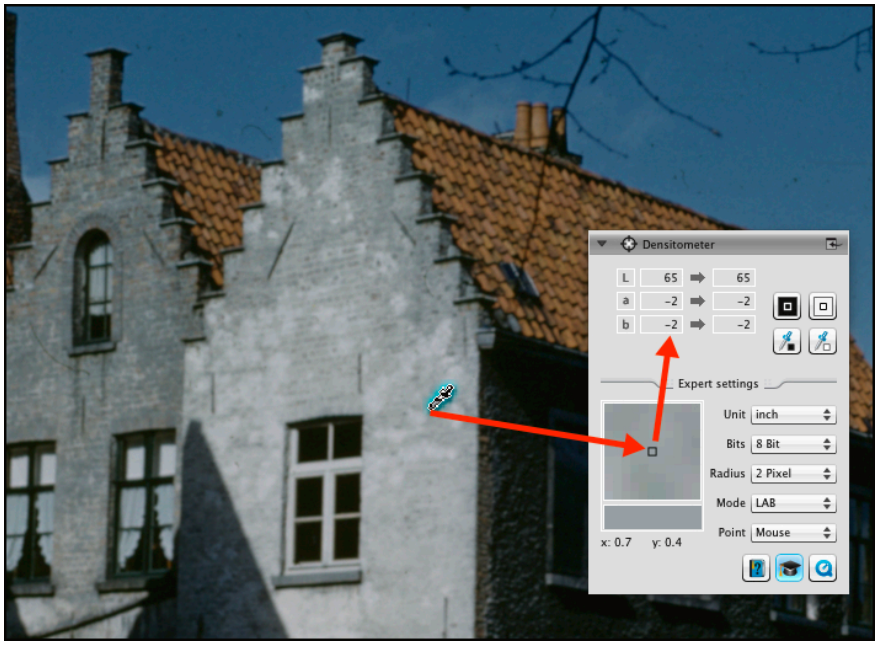


Figure 8.1a Densitometer for Finding "Neutral"

Floating the **Densitometer** (detailed explanation of this tool in Chapter Seven) near to your image, (or even on it as I did in Figure 8.1a above) and using it to assess where to apply **neutral points** using the **Neutral Pipette** can be very helpful. I recall for convenience here that the left column of values in the top part of this panel are the "start" values before making adjustments, and the right column of values is the result of adjustments you made. Before you do any image editing, the values in the two columns should be the same.

When you look casually at the building facades in Figure 8.1a, you may be inclined to think they are all varying brightness levels of gray – or should be. Well, the fact is that in this image, as the scanner sees it, they aren't all "gray". Whatever the correct scene colours may be, as I take measurements from place to place across each of the facades I observe that the colours vary.

As I hover the cursor over the building facades (Figure 8.1a), the examined pixels are magnified in the window of the **Densitometer**[30] (**Expert** settings in **Ai Studio**) and the pixel values are shown in the readout pointed with the red arrow. The exact shade I show here is slightly cyan, being negative **a** and negative **b** (**Lab** scale) - a mixture of slight green and slight blue. I made this photo in Bruges, Belgium back in 1959, so even if I don't remember exactly (it is now 2012), I doubt these facades were ever meant to be bluish. I think they were meant to be gray, so I believe this may be an excellent point to neutralize with the **Neutral Pipette**; and doing so will ever so slightly "warm-up" this photo overall, which it could use.

On the next page I provide three illustrations showing how the process works on this image. After this demonstration I provide detailed instructions on how to do it. Perhaps it will help to magnify your screen view of the next page so you can read the numbers on the **Densitometer** more easily as I proceed. (I use the **Lab** colour scale - **Ai Studio,** only for information**,** as it separates brightness from colour. **L**= lightness – the higher the number the lighter the tone; if **a** is below (or above) 0 it indicates a greenish (or magenta) cast; if **b** is below (or above) zero it indicates a bluish (or yellowish) cast. If **a** and **b** are zero the measured pixels are gray. But you could also use **RGB** mode in any version of SF8, whereby when the values are such that R=G=B at whatever level of brightness, the pixels are some luminance level of gray.

As an alternative to using the **Densitometer** for measuring start and result values of adjustments with the **Neutral Pipette**, the tool has its own information panel that appears in the Dock when you place the first point and then click on its little left-side triangle (Fig. 8.1b, red arrow, left edge). It can make readings in RGB or CMY, and is shown (floated) in Figure 8.1b, where the top row of readings is the **Source**, or the start values, and lower row is the **Destination**, or the result values from an adjustment. By clicking on the trash icon to the right of the values, you can delete a Neutral Pipette point without affecting any other adjustments made to the image. One panel will appear for each point placed, up to four (in Ai Studio).

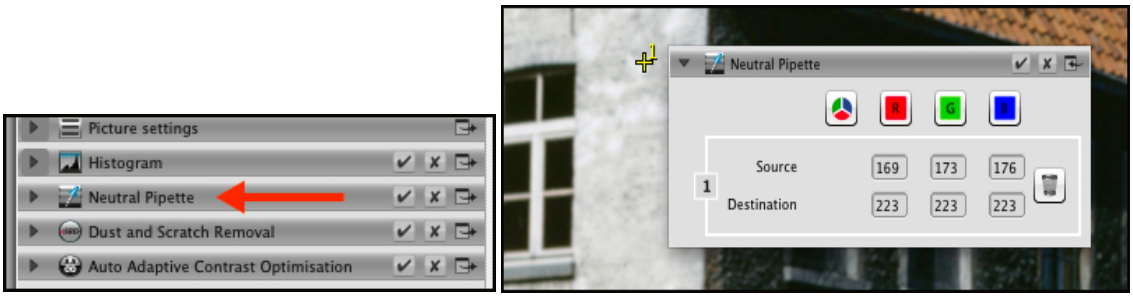
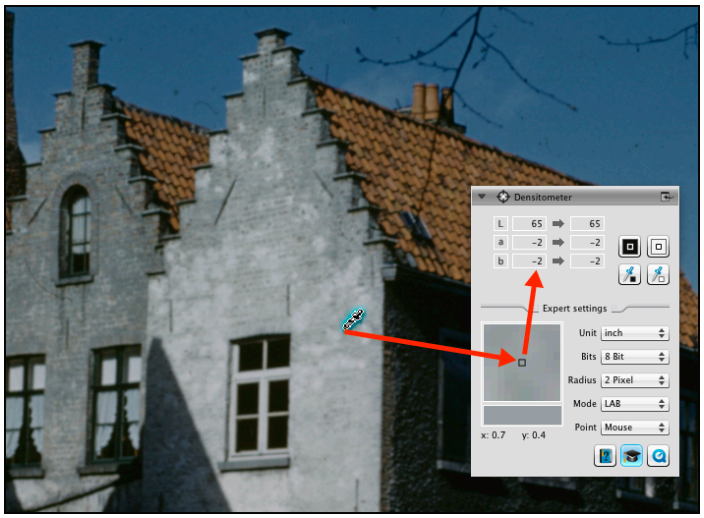
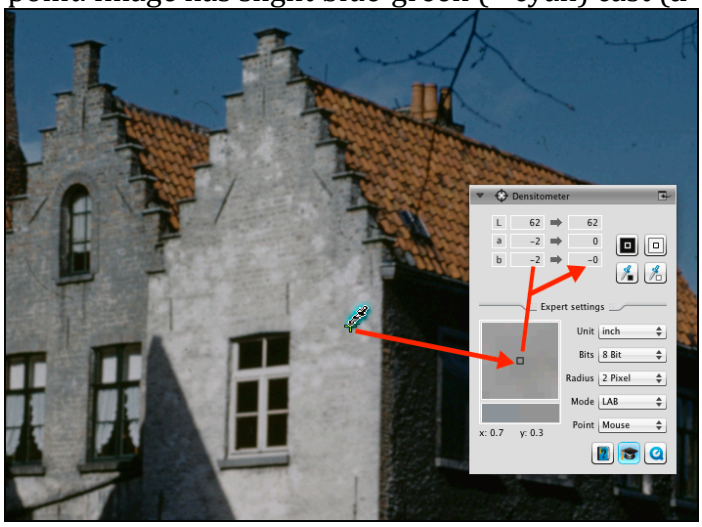


Figure 8.1b – Neutral Pipette Panel

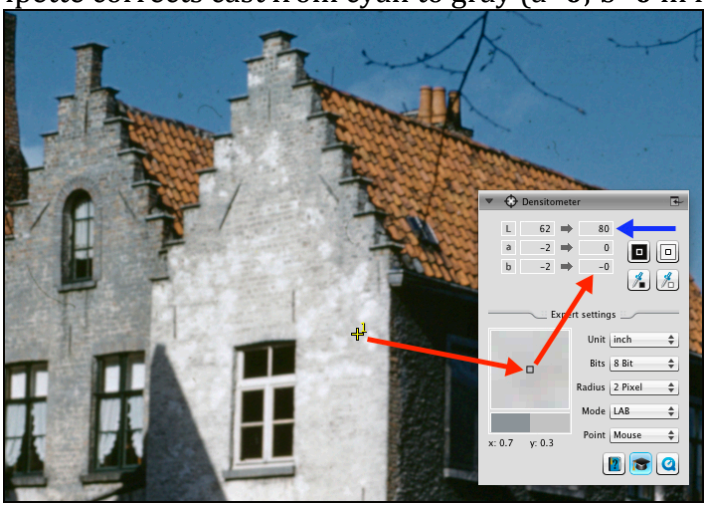
[30] This window of the **Densitometer** is not available in the **SE** and **SE+** versions of SF8, nor do those versions give users the choice of a **Mode**, such as **Lab**. They provide **RGB**. However, in those versions the **Densitometer** still provides the numerical readings in **RGB** and those are very helpful for using the Neutral Pipette.



8.1c. Start point. Image has slight blue-green (= cyan) cast (**a**=-2; **b**=-2).



8.1d. Neutral Pipette corrects cast from cyan to gray (a=**0**; b=**0** in right read-out)



8.1e. Dullness is corrected using the **Histogram** tool, resulting in **L** moving from 62 to 80 (blue arrow). Notice that the neutrality of the colour setting was not affected by the change in brightness (a=**0**, b=**0**). This is good application behaviour.

As long as you can identify points that should be neutral, the **Neutral Pipette** is the fastest and easiest way to rebalance a prescan. To use the **Neutral Pipette**, you must be in the **Manual** workflow mode (Red workflow icon in the upper left corner of the SF8 interface). SilverFast (**Ai Studio**) is the only application that allows you to set four such points for estimating and balancing the colour of a film scan. It is often the case that more than one point is needed to correct for the variability of different colours around neutral that should be neutralized to adequately mitigate the appearance of the colour cast. Having the option of four points is also helpful in respect of what I said above about the difficulty of detecting a point that should be exactly neutral gray. It is usually much easier to use the **Neutral Pipette** in SF8 or in SilverFast HDR than attempting white balance in Photoshop, where it is often necessary (working rigorously) to identify and adjust the white, gray and black points of the **R**, **G** and **B** curves individually – a tedious process.

To use the tool, click on the **Pipette** icon in the tool column to the left of the image preview (Figure 8.1 above). Then select **Neutral Point**. Your cursor will become an eyedropper. There are two ways of applying it: one shot at a time, or multiple placements.

For the one shot at a time approach, simply click the eyedropper on the point in the image that you wish to neutralize. If you think you need to sample more points (up to four in **Ai Studio**), return to the **Pipette** tool, reselect the **Neutral Point** option and re-click the eyedropper on the next sample point in the image.

For the multiple placement approach, after selecting the **Neutral Point** option in the **Pipette** tool, hold down the OPTION (ALT) key as you click the eyedropper on the first sample point., and keep it held down for up to the four point placements you may wish to make. For the last one, do not hold down the OPTION (ALT) key.

Figure 8.2 In-Situ Pixel Value Read-Out

With the **Neutral Pipette** active, if you hover the hole in the hand (cursor) over a point you placed and SHIFT-Click, it will place the pixel reading near the point (Figure 8.2, red arrow); you can remove it by repeating SHIFT Click on the same point. These read-outs never appear in a scanned image, by the way!

You may undo points set with the **Neutral Pipette** one at a time by clicking on the trash for that point; or to remove all of them at the same time, click on the **Pipette** tool, then click on **Reset Auto**, or use the shortcut CMD OPT A (CTRL ALT A). These two methods will also undo brightness adjustments made in the **Histogram**.

White Point and Black Point:

The Pipette tool also contains **White Point** and **Black Point** options. These tools affect both colour balance and luminosity, so if you wish to adjust each aspect separately these are not the choice tools to use.

The main reason to use them would be to obtain a very quick and efficient recasting of contrast and colour balance provided you know that there are points in the image that really should be the colour black and below which no other tone values will show, or really should be white and above which no other tone values will show.

For these options, you may place only one point for each (can be undone with CMD-Z), and they do affect the tonal distribution in the Output Histogram (Picture Settings panel, Figure 8.3). You place the points by selecting them (one at a time) from the Pipette tool and clicking on the points in the image that you want to set as Black or White. When you do so, please verify the Output Histogram for evidence of tone clipping at either end of the scale and satisfy yourself that what you see is what you want.

I show evidence of why caution is needed in Figure 8.3. I selected what I thought should be a white point from the license plate (blue arrow). But in fact, it's not a good decision, because there are lighter tonal values containing detail I would like to preserve – on the hood of the car and the left head-lamp, for example (black arrows). By setting the white point on the license plate, all the lighter tones get compressed to the far right of the histogram (Figure 8.3, black oval and arrow), eliminating detail in a uniform mass of excessive brightness, as compared with the tonal detail you see for the highlight areas in Figure 8.4 below.

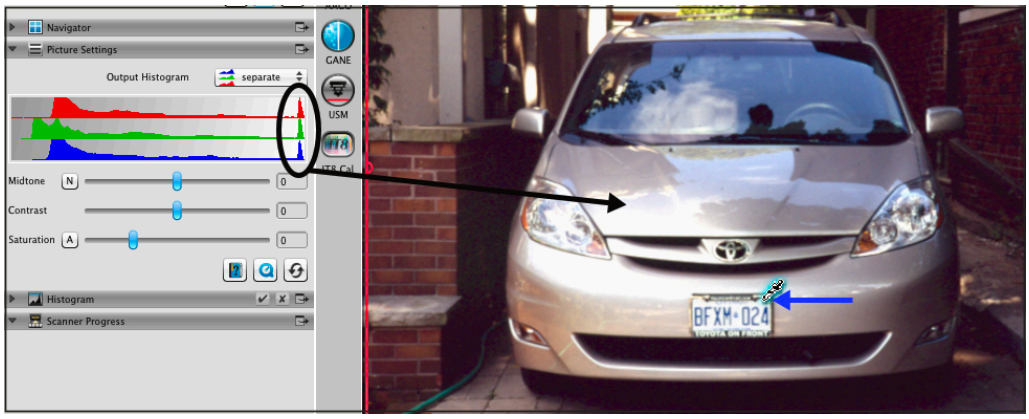


Figure 8.3 Inappropriate White Point - Compressed Highlights

8.2 (ii) Global Color Correction (GCC)

If you cannot use the **Neutral Pipette** for neutralizing a colour cast, the next best option is the **GCC** panel (Figure 8.4). To open it into the Dock, click on the **GCC** icon in the tool row (top of the interface, Figure 1.6).

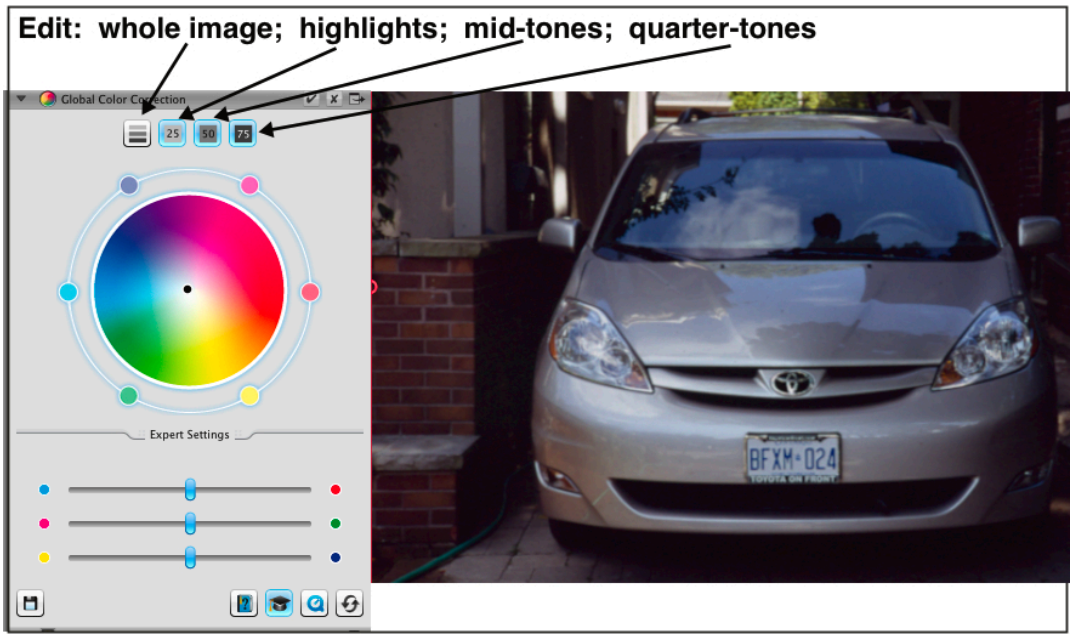


Figure 8.4 Global Colour Correction Panel, Ai Studio Version

It consists of a colour wheel with a black dot in the center (which is white) and buttons around the circumference for each of the six main colour groups. At the top of this interface, there are four buttons for selecting the luminosity range over which you want the correction to apply. By clicking on the leftmost button, the whole image is included in the adjustments. By clicking on each of the next three buttons, **25, 50, 75**, you are selecting to isolate the effect of adjustments to the highlights (three-quarter tones), midtones and quartertones respectively.

There are two ways of rebalancing colour using this interface. You may drag the black spot to the place in the colour wheel that produces the best overall balance (a visual impression you get from looking at the image on your display). Once again I underline the importance of a properly calibrated and profiled display for a colour managed workflow yielding predictable colours across devices.

The other approach is to click your mouse repeatedly on the colour button corresponding with the colour group TO which you wish to move the image's colours. For example, if you think your image has a Cyan cast, you would counterbalance that cast by reducing Cyan, which means increasing Red. Therefore click on the Red button until the Cyan cast is reduced. You may need to make similar adjustments to at least one other colour group until the colour cast is removed. I provide an example of a correction in Figure 8.5, exaggerated intentionally to

illustrate the effect. Here I removed a blue cast by increasing its opponent colour: yellow. Notice the positions of the black dot, and the Yellow<>Blue slider.

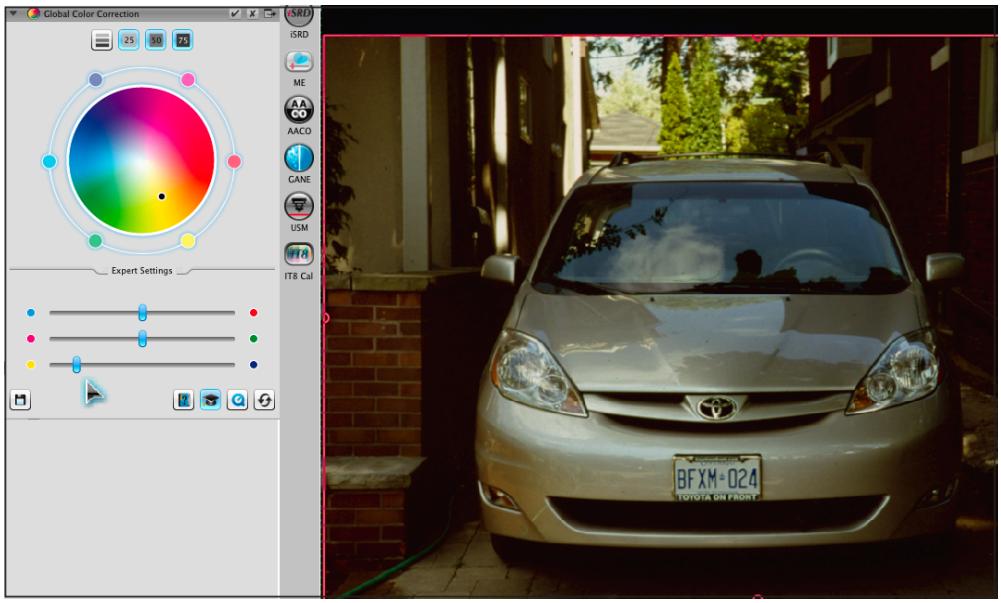


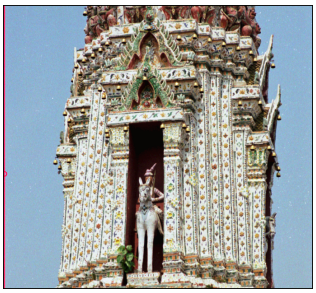
Figure 8.5 Use of Global Colour Correction - Exaggerated

Figure 8.5a Sensible Use of Global Colour Correction

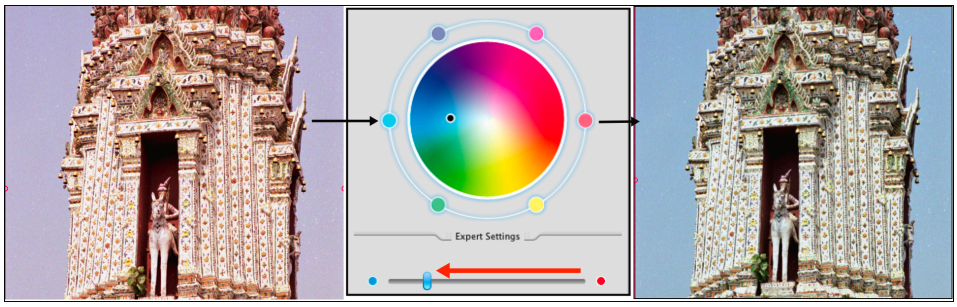
In Figure 8.5a, contrary to the exaggeration of Figure 8.5, I show a sensible use of **GCC**. Note the overall bluish cast in Figure 8.4 and the **Densitometer** reading in the left data column ("before adjustment" values, green box) showing **a**=-1 and **b**=-3, a moderate cyan-blue cast in the stone at the end of the blue arrow, which I selected as the neutral criterion. It only required a **very moderate** shift toward yellow and red (black arrow inside the colour wheel) to eliminate this cast, changing **a** and **b** to 0 (green box, right column, "after adjustment values"). The colour balancing primer below provides general guidance on this technique of colour correction.

INSET: Colour Balancing - Quick Primer

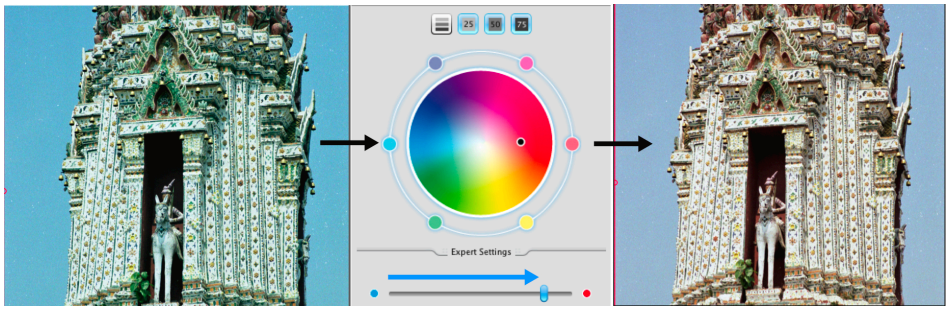
(0) Here's how the image should look when correct:



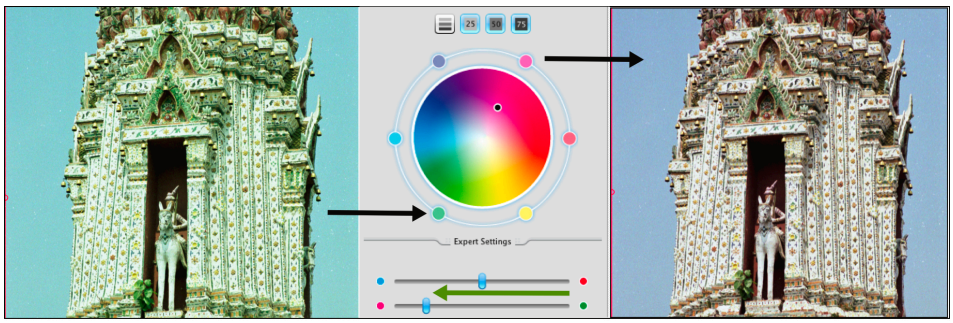
(1) To eliminate a **red** cast, add cyan (this neutralizes red):



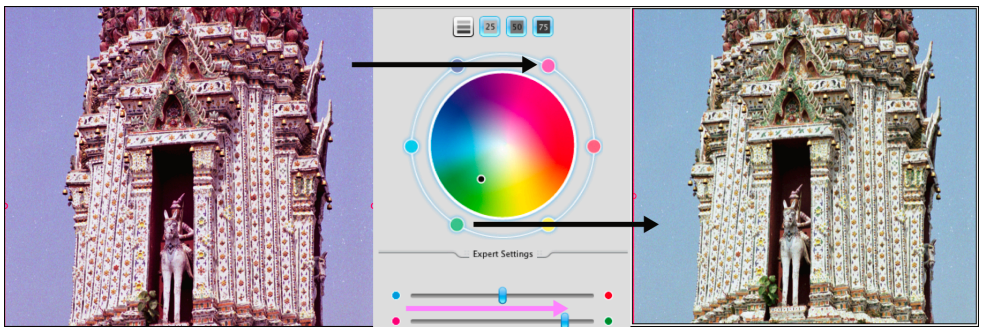
(2) To eliminate a **cyan** cast, add red (this neutralizes cyan):



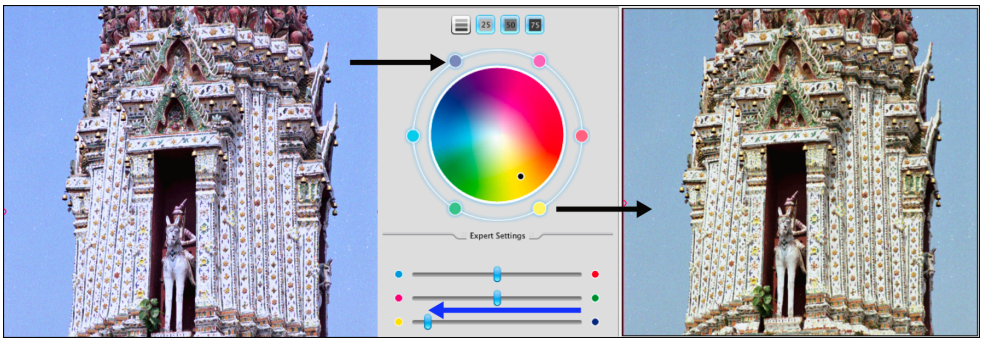
(3) To eliminate a **green** cast, add magenta (this neutralizes green):



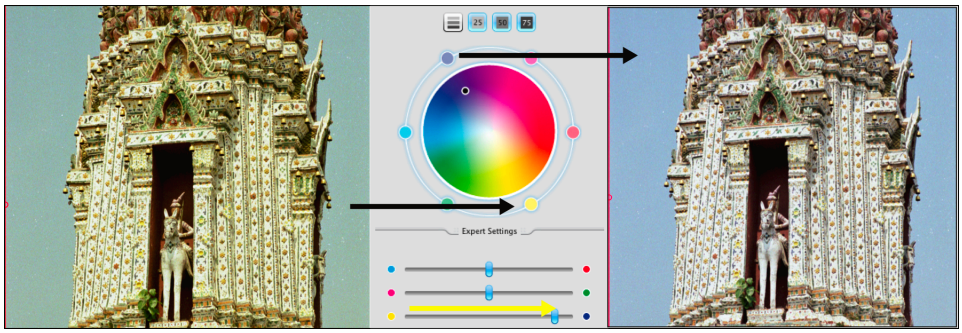
(4) To eliminate a **magenta** cast, add green (this neutralizes magenta):



(5) To eliminate a **blue** cast, add yellow (this neutralizes blue):



(6) To eliminate a **yellow** cast, add blue (this neutralizes yellow):



THE GENERAL RULE

IDENTIFY THE HUE OF THE CAST ON THE COLOUR WHEEL AND MOVE OUT OF THAT COLOUR DIRECTLY TOWARD THE EXACT OPPOSITE COLOUR.

You can operate between colour groups any where as needed. You are not confined to exact locations on the wheel.

If your version of SF8 gives you access to the **Expert Settings**, which you access by clicking on the button with the grad-cap, you can make these same adjustments by moving the sliders for any of the three opposing colour groups.

You may save the settings you made by clicking on the lower left **Save** icon, and giving this group of settings a name in the pop-up dialog. This way, you can load the same settings to other images having the same cast.

If you don't like what you did, you can reset the panel to default by clicking in the lower right-most icon in the panel.

8.3 (iii) Selective Color Correction (SCC)

You access this panel by clicking on its icon **Selective CC**, located in the row at the top of the SF8 interface. It will open in the Dock (Figure 8.6).

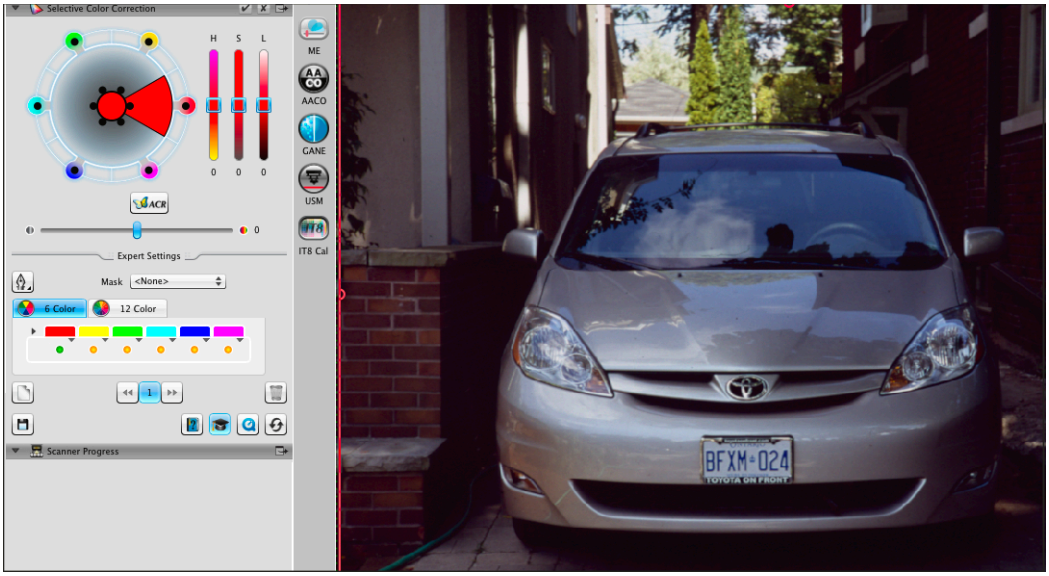


Figure 8.6 Selective Colour Panel (left side)

As the name implies, this panel is used primarily for amending particular colour groups without changing the overall colour balance of the image. But it has two other functions: a control for restoring colour to faded originals, and controls for rebalancing the luminosity of Black and White conversions. I discuss this latter option in the next chapter.

I think the implementation of this tool is particularly effective and flexible in SF8. The interface is quite sophisticated, as it has a targeted adjustment tool you will not find, for example, in Photoshop's Selective Color Adjustment Layer.

Once you've identified the object whose colour you'd like to amend, you click on it, and that will select the corresponding colour group in the wheel seen in the SCC panel interface (Figure 8.7, upper, blue arrow). You now have two options for editing the colour: either within the colour wheel, or by using the HSL sliders to the right side of the wheel. I'll look at both.

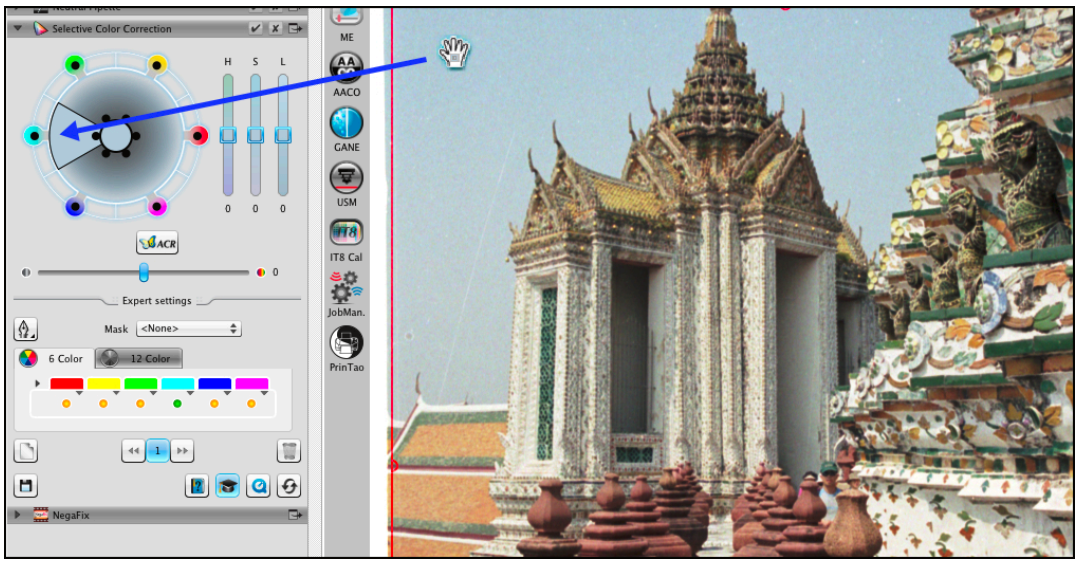


Figure 8.7 Targeting the Sky for Selective Colour Change

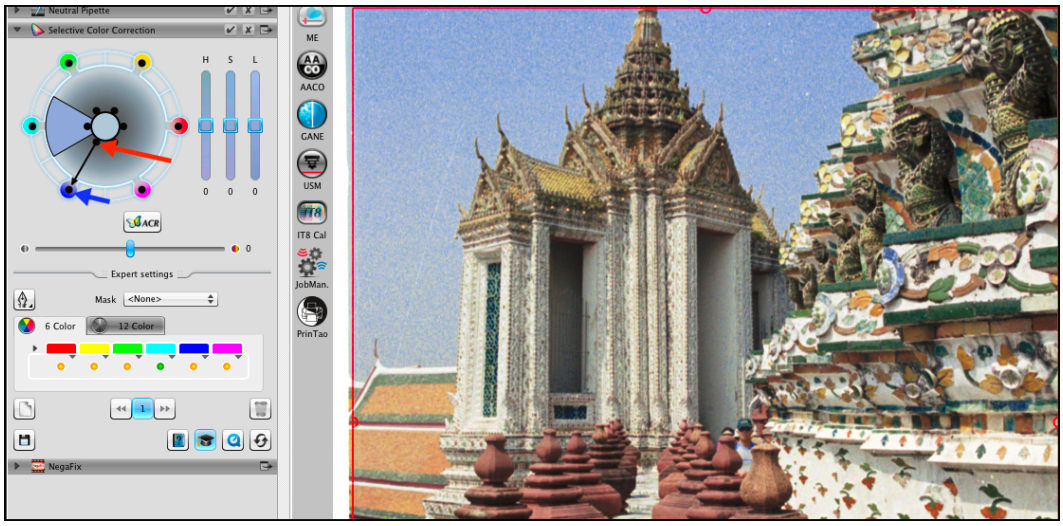


Figure 8.7a Changing the Sky from Cyan to Blue

Within the colour wheel, there is a small inner circle surrounded by black dots, one for each colour group. Let us say the group you have selected to edit is cyan, and you wish to make it more distinctly blue. To do this, click and drag the black dot sitting on the edge of the small middle circle opposite the blue button toward the blue button on the outer circle (Figure 8.7a, red arrow the start position, blue arrow pointing to the button you are dragging toward; the thin black arrow shows the direction of dragging and colour change); you will observe the cyan sky tone becoming more blue as you drag closer and closer toward the blue outer button. You may also notice how well this tool works as intended, because no non-blue colours are affected by the cyan-blue hue change done to improve the sky.

Figure 8.8 Targeting a Colour for de-Saturation

In Figure 8.8 I am preparing to de-saturate the earthen-coloured stonework, which I do by clicking on the colour to be desaturated, and it becomes selected in the colour wheel (blue arrow). Within each of the coloured buttons on the outer circle, there is a black dot. By clicking and dragging the black dot for the selected colour toward the centre, you will remove that colour (desaturate it) from the target area (Figure 8.9, red oval). Now, of course, this also removed red hues in other objects having them and that I may not have wanted to desaturate, such as the tile roof in the background and reddish elements in the wall decorations. I shall turn to isolating the targets for selective colour changes further below.

Figure 8.9 Earthen Stonework de-Saturated

Contrariwise, you can saturate a colour by clicking and dragging the black dot on the inner circle (which then turns white) opposite the colour you wish to saturate toward that colour on the outer circle, and you will see the colour intensify as you drag. So, for example, if you wished to saturate the earthen tones, you would move the black dot on the inner circle opposite the red dot toward red on the outer circle, and the earthen tone will become more pronounced (Figure 8.10, red oval) – well in this case REALLY pronounced, just to make the point. Another important observation emerging from my selection of earthen tones, is that by clicking on the

object to be adjusted, the appropriate tone is selected in the colour wheel, where the colour range within which it sits is graphically portrayed by the coloured cone lodged between the inner and outer circles. Hence, one is not adjusting only one of six colour groups – one can be adjusting any hue in the spectrum, defined by the selected target.

Figure 8.10 Saturating Earthen

The fun thing about this interface is that you have countless possibilities. For example, you aren't confined to making one adjustment to a colour group. You can stretch and amend any colour between any of the groups as you wish and produce different outcomes with each added adjustment. Take, for example, the sky I made very blue in Figure 8.7a. I could desaturate it by grabbing the dot in the blue button and moving it toward the center (Figure 8.11, black oval), then add a mixture of red and yellow to produce an orange sky, simulating sunrise, by dragging the black buttons on the small circle opposite red and yellow toward those colours (Figure 8.11, orange box).

Figure 8.11 Mixed Colour Edit of the Sky

But that's not all. Beside the colour wheel, there is a set of **HSL** sliders, for Hue, Saturation and Lightness respectively. For whatever colour set you have selected or fabricated on the colour wheel, you can adjust its Hue, Saturation and Lightness using these sliders. I illustrate what is described below on the next page.

In the default position, there is a blue square surrounding each strip. Clicking and dragging the square on the **S** or **L** strips changes Saturation or Lightness respectively of the selected colour, increasing as you move a slider upward, decreasing as you move it downward.

Clicking and dragging the **Hue** slider shifts the selected colour to its cooler constituent going upward, and its warmer constituent going downward. Hence, referring to Figure 11a on the next page, if you are on the reds, moving the **Hue** slider upward changes the hue to magenta, and moving it downward changes it to yellow, the component colours of red. Moving the **saturation** slider downward desaturates reds (moving it upward would saturate them). Moving the **Lightness** slider upwards lightens the reds (moving it downward would darken them).

One note of caution about all these changes: when you select an object whose colour you want to change and change it, you are also changing the colour of all other objects having the same colour. For example, in Figure 8.9 you may have noticed that objects of the same colour range not intended for desaturation got desaturated anyhow. To avoid that, you need to do layering and masking, as described below.

Underneath the wheel there is a tool called **ACR**, for **Auto Color Restoration**. If you have media with faded colours, moving this slider to the right will restore faded colour by strengthening the colours that remain (Figure 8.20).

If you have the **Ai Studio** version, click on the button with the grad-cap in the lower right to open the **Expert Settings**, and three additional sets of controls become available: layering, masking and dialing-in colour by the numbers (Figure 8.12, page after next, in the **Layering** discussion).

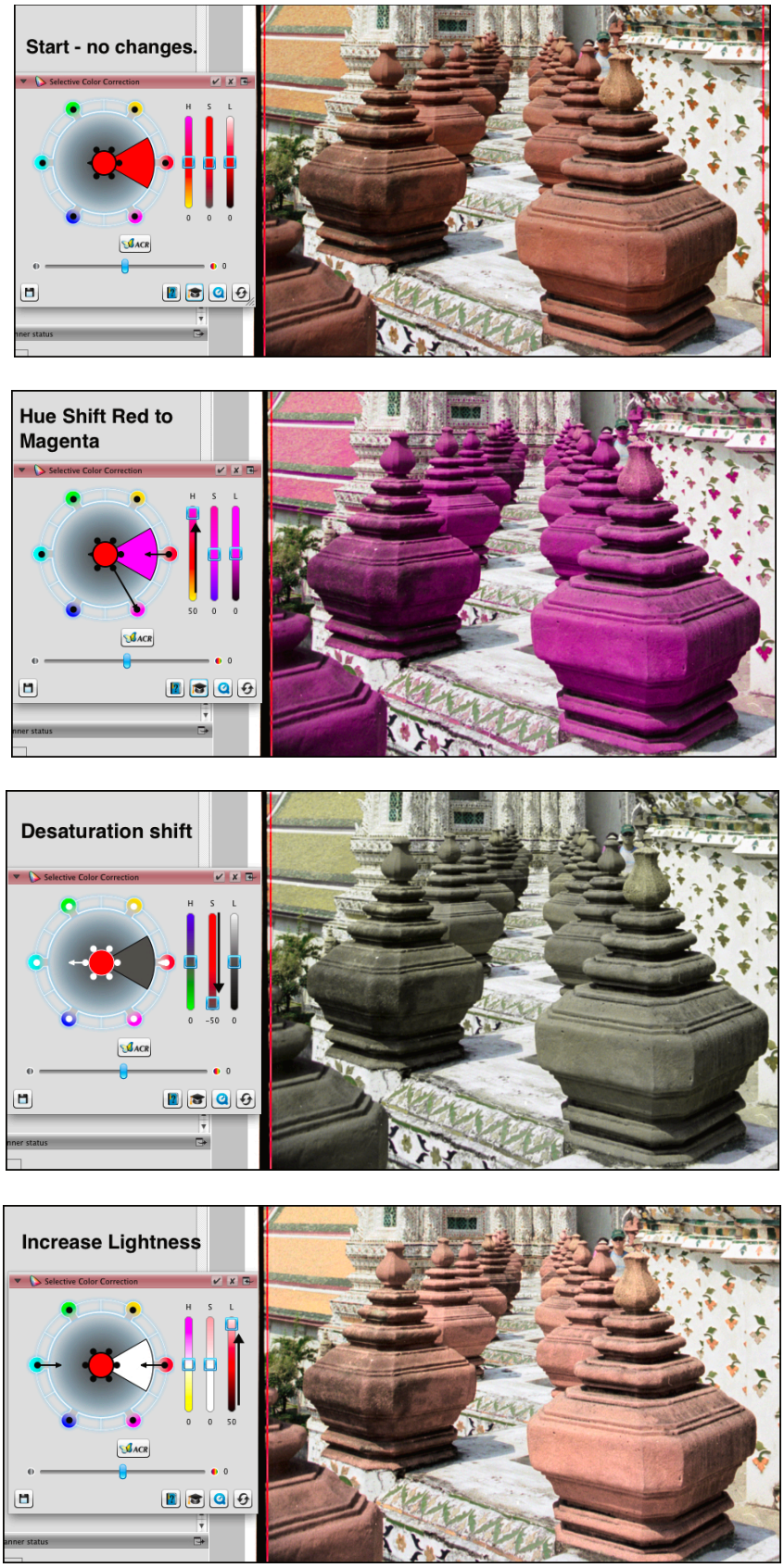


Figure 8.11a Hue, Saturation and Lightness Adjustments

Layering

Layering allows you to create separate **SCC** effects on different layers of the image, such that one effect doesn't interfere with the other, and objects can be isolated.

The layer controls are the row just above the **Save, Expert** and **Reset** buttons (Figure 8.12). Click on the far left icon to create a layer, and on the far right icon in that row to trash it. The active layer number is the one showing in a blue box in the center of that row. Toggle between layers by clicking on the arrow keys to the left and right of it.

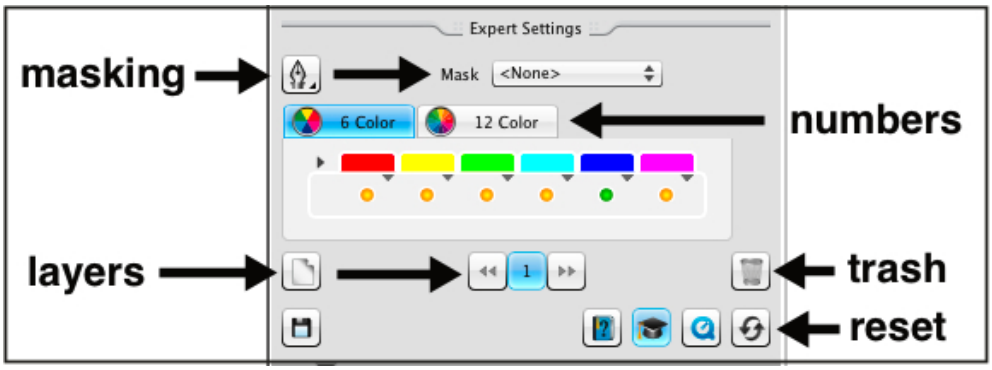


Figure 8.12 SCC Expert Settings

You may create up to a total of four layers for implementing different SCC effects in the different layers. This is especially useful in combination with the masking function described below, because it allows you to convert objects having the same colour into different colours from each other. I demonstrate this below.

Masking

This tool allows you to create masked areas of the image in which you can implement SCC effects. To draw a mask (SF8 Ai Studio, Expert Settings), use your left mouse button to click on the pen icon (located to the left of the drop-down that says **Mask** – Figure 8.12 upper left) and hold it down for several moments. A drop-down menu will appear giving you the choice to create a **polygonal** mask or a **path** mask. Select which of the two mask types you wish to use by clicking on one of the choices in the drop-down menu (Figure 8.12a by the red line).

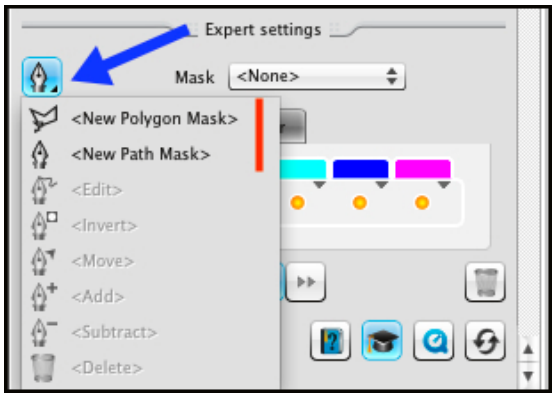


Figure 8.12a Selecting a Masking Tool

For creating a **path** mask **using the pen tool**, move your cursor to the image and place (by clicking in right spot) two dots on the perimeter of the area you wish to mask (for example by the black arrows in the sky of Figure 8.12b). You extend the path delineating the area to be masked by placing dots where you need them as you go along.

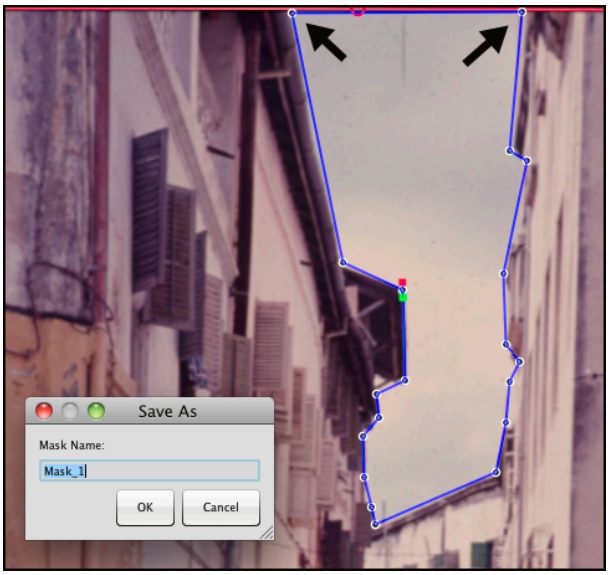


Figure 8.12b Making and Saving a Path Mask

As you move the pen from spot to spot the tool will create blue lines joining the dots. The red and the green dots at the ends of the path are there to help you steer the shape of the line around the area you wish to mask, by clicking and dragging them. Using these dots can be tricky. It takes practice to learn how to control them properly, but once you've mastered it, you can do some fairly precise delineation with it. The mask is complete when the last line joins the first dot, creating an enclosed surface area (delineated by the blue outline in Figure 8.12b, where I made a mask of the sky); a **Save As** pop-up menu will ask you to name it. Do so in the pane provided and click **OK**. (I've named it **Mask_1**.) The mask is made and ready for SCC adjustments.

For creating a **polygonal mask**, select the polygon option in the **Pen** drop-down menu. Use the left mouse button to click, hold and drag the pen into the shape of polygon you want. This must be done all in one operation. The moment you release the mouse button, the **Save As** menu will pop-up. Give the mask a name in the provided pane and click **OK**. The mask is now ready for SCC adjustments.

To edit a path mask, click and hold on the pen icon, wait for the drop-down menu, select **edit**, then proceed back to the mask on the image and make adjustments.

To delete a mask, select the mask in the pane holding the mask list (Figure 8.12.c, black arrow), then click the **pen** icon (which now shows either a pen or a polygon depending on the drawing method), wait for the dropdown menu, click on **Delete** (Figure 8.12c, blue arrow); a menu will come up with a list of your masks. Select the mask you wish to delete – it becomes highlighted in blue and then click on the **Delete** button at the bottom of that dialog (Figure 8.12c, red arrows); your mask will be deleted. Close the dialog by clicking its red button in the upper left corner.

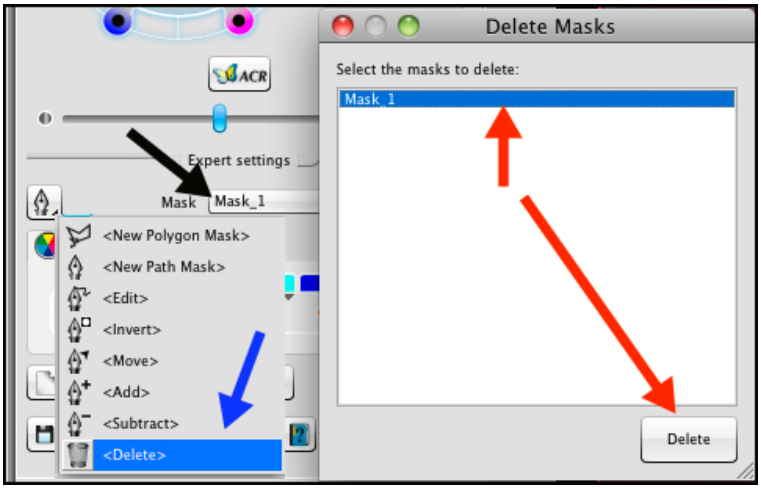


Figure 8.12c Deleting a Mask

I implemented an exercise based on Figure 8.9 to demonstrate how it works – and that it DOES work (Figure 8.13). The object of the exercise is to make each row of earthen shapes a different colour (even though they start as the same colour), and to leave all other objects having similar colours unaffected. Here's the **step-by-step**:

- Select the pen tool in **path** mode and draw a path around the right row of earthen shapes (Figure 8.13a).

Figure 8.13a Mask the Right-side Row of Earthen Shapes

- When the path is closed (last line joins the first), a **Save As** pop-up menu appears.
- Type-in the name **Earthen-1** and click OK (Figure 8.13a, black arrow).
- Convert the colour of the shapes to Green by clicking on one of them and then dragging the inner circle button facing green toward the outer circle green button (Figure 8.13b).

Figure 8.13b. Convert Right-side Row to Green

- Create a second layer, and draw a path around the left-side row of earthen shapes, giving this mask the name **Earthen-2** (Figure 8.13c).

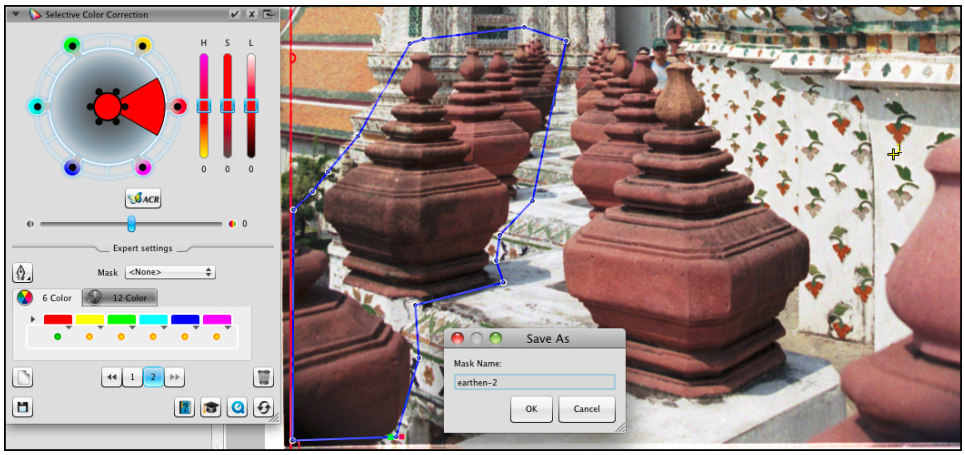


Figure 8.13c. Create Layer 2 and Mask the Left Row of Earthen Shapes

- Finally, convert this row of earthen shapes to lime by dragging the button on the inner circles across from the yellow button toward the yellow button (Figure 8.13d, where the effect of both masks is displayed).

Figure 8.13d. Convert the Left Row of Earthen Shapes to Lime

We're done. The left row is lime, the right row is green, and nothing else in the image that is within the earthen-red colour range has changed colour. The mask frames will NOT appear in the scan.

Colour by the numbers

In the **Expert Settings**, you have the choice of a six or twelve colour matrix for adjusting the hue of those colour groups. You make these adjustments by entering numbers in the provided data fields linking the colour you wish to adjust with the six alternative colour groups you can adjust toward.

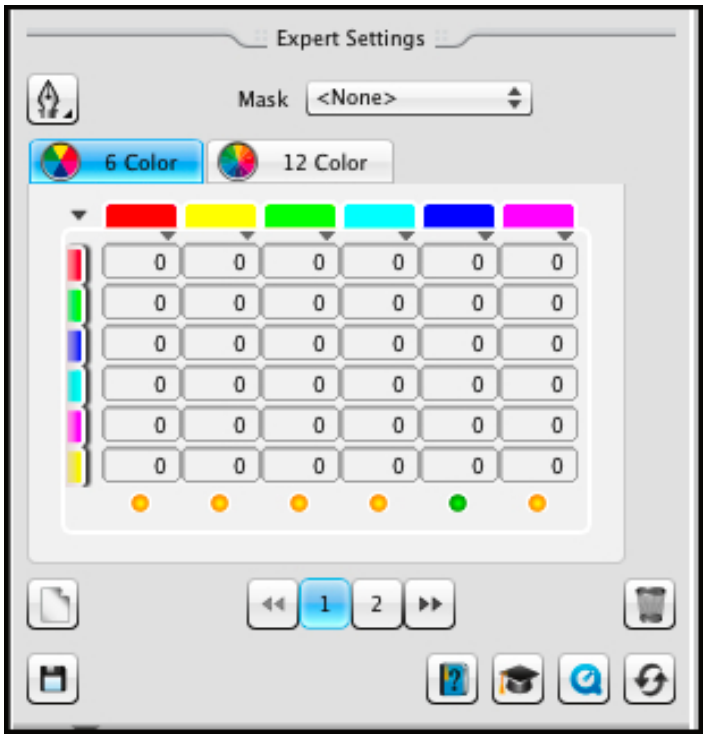


Figure 8.14 Selective Colour Matrix

To select either the six- or the twelve-colour option, click on the appropriate tab in the SCC Expert dialog panel. Then click on the tiny triangle immediately to left of the red field. This will open a **vertical column** of the six colour groups you can adjust **toward**, as well as the matrix of boxes into which you can enter the values you want.

As the principle is the same for the six- and twelve-colour panels, I shall use the six-colour panel for purposes of illustration here.

As in the wheel-based approach, you begin by clicking on the colour in the image you wish to change. Under the matrix there is a row of yellow dots. The dot corresponding with the selected colour will turn green. This identifies the column in the matrix you will work with. The column of colours on the left side of the matrix identifies the rows of colours you would change TOWARD.

Let us say, for example, you have selected the red roof (Figure 8.15, center panel) as the colour you wish to change FROM, and you wish to make it green. Looking at the column of six colours at the left side of the matrix (Figure 8.15 left panel), green is in the second row. Therefore you would enter a positive value for green in the square of the matrix that links the red column with the green row. The range is from -200 to +200. Negative numbers increase the saturation of the colour you are trying to change FROM, and positive numbers move you toward the colour you are trying to change TO. Entering +200 in the box linking the red column with the green row, makes the red in the image change to green (Figure 8.15, right panel) without affecting any other hues in the image.

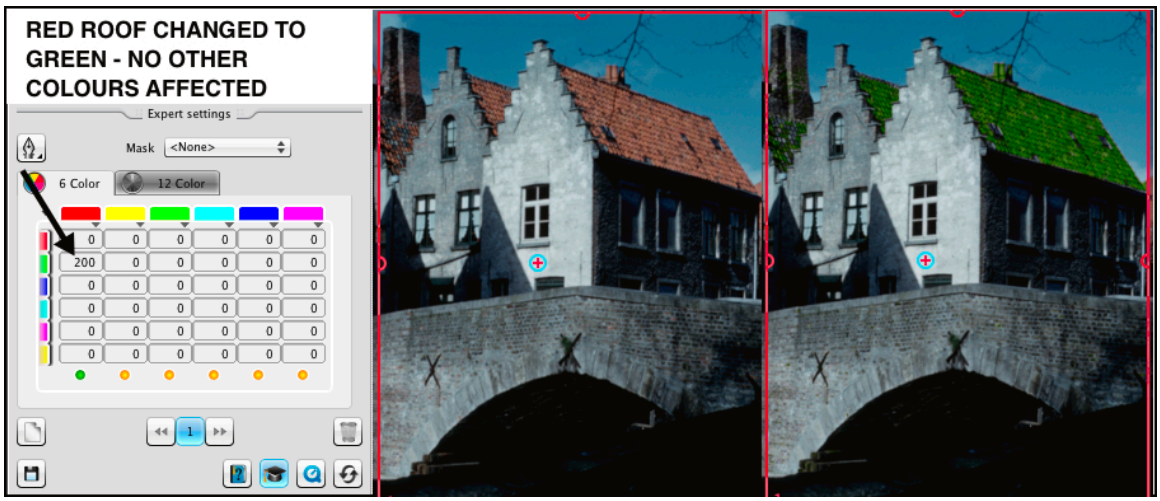


Figure 8.15 Red to Green by the Numbers Matrix

Using the methods described above, you may also use this matrix in conjunction with layers and masks to isolate the colour change in a manner affecting the same colour in some places, but not others.

8.4 (iv) Using the Histogram and Gradation Curve for Global Colour Shifts

You can use the **Histogram** and **Gradation** tools for making **global** colour changes by shifting the individual RGB or CMY curves. The mid-tone slider in the **Histogram** panel is linked with the **Gradation** curves, such that any movement of the mid-tone value of a colour channel (center slider under the Histogram) in the **Histogram** panel will produce a corresponding shift of the selected colour curve in the **Gradation** panel. Shifting the end points of the **Histogram** has no effect on the **Gradation** Curves.

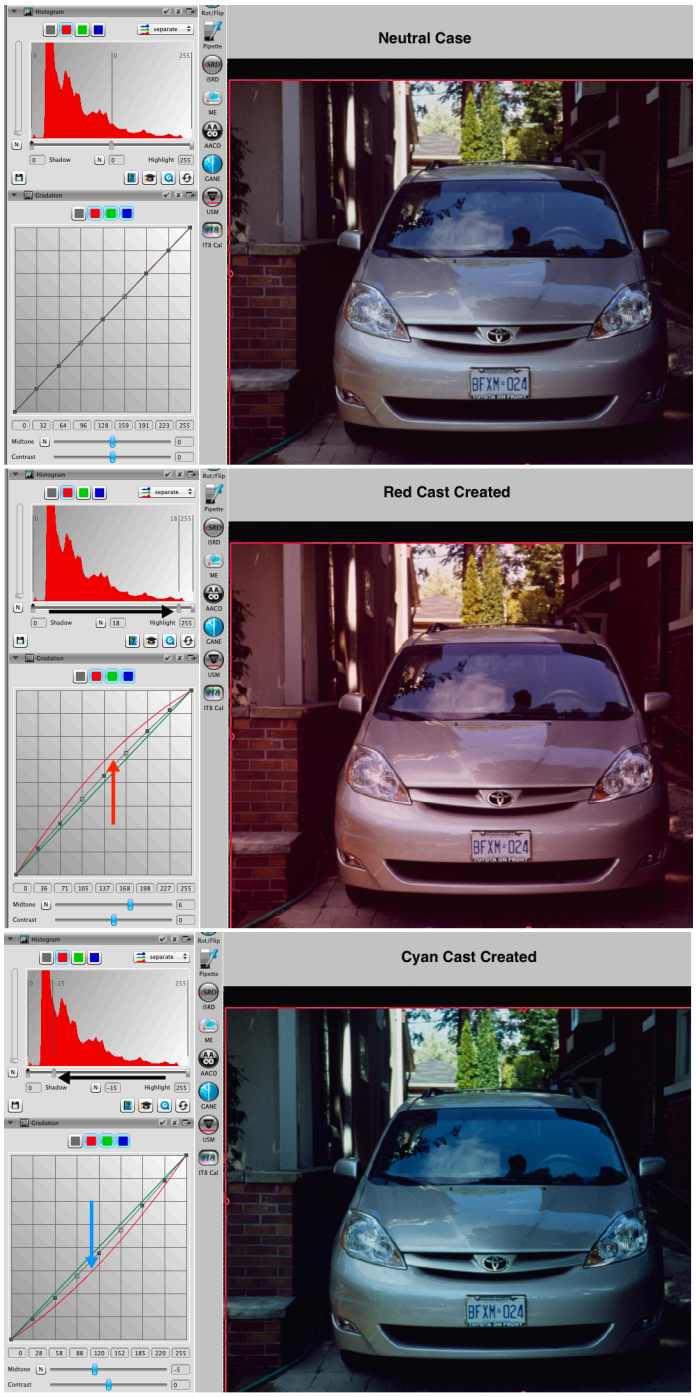


Figure 8.16 Red Channel Midtone shifts

The underlying principle here is that if you darken the selected colour you reduce it, revealing its opponent colour; if you brighten the selected colour you increase it, reducing its opponent colour. For example (Figure 8.16), selecting the red channel (by clicking on the Red icon above the graph) in either the **Histogram** or **Gradation** Curve:

in the **Histogram** panel:

- Moving the midtone slider to the right brightens red, increasing its presence in the image (Figure 8.16, middle panel, black arrow);
- Moving the same slider to the left decreases red brightness, increasing the presence of Cyan in the image (Figure 8.16, lower panel, black arrow);
- Moving the dark point (left) slider to the right darkens red, increasing the presence of Cyan (Figure 8.17);
- Moving the white point slider to the left brightens red, increasing the presence of red (Figure 8.17); and

in the **Gradation** panel:

- Moving the midtone slider to the right, the red gradation curve shifts upward to the left;
- Moving the midtone slider to the left, the red gradation curve shifts downward to the right.

Figure 8.17 Split-tone and Clipped Red

You can get some interesting colour split-tone effects playing with these controls. Using the example above, moving the black-point and white-point sliders inward, the dark tones take on a Cyan cast and the light tones take on a Reddish cast (Figure 8.17). The balance between them is shifted by how you move the mid-tone slider between the black and white endpoints you have set. Creative effects can be developed experimenting with these possibilities. If you scan to SilverFast HDR, make some such set of adjustments there and you wake up one morning deciding that you don't like your most recent "creative burst", you can undo it all and create something else without having to rescan the media.

The one downside of these adjustments is that they affect both the colour and the luminance of the selected colour channel. This means, for example, that as you brighten red, the affected image area also brightens. For this reason it is good to keep your eye on the separate channels mode in the **Output Histogram**, so you can easily see whether you are clipping tonal information in any of the channels. In the example of Figure 8.17, there is indeed red channel clipping as shown by the green arrows and the manner in which it has blanched all detail out of all the levels from 175 upward (read from the rightward vertical demarcation line in the histogram of Figure 8.17). Normally one should avoid clipping highlight detail, save for specular highlights in which there is no detail.

Now, if you have the **Expert Settings** in the **Histogram** panel, you may effect these changes to either the RGB channels or the CMY channels. To select the channel set you want, click the left most tri-color button in the row of buttons above the graph. This toggles between RGB and CMY (Figure 8.18, black arrow, where I show the CMY set). Please observe: whereas shadows are to the left and highlights to the right for the RGB channel set, the opposite is the case for the CMY set: highlights left and shadows right.

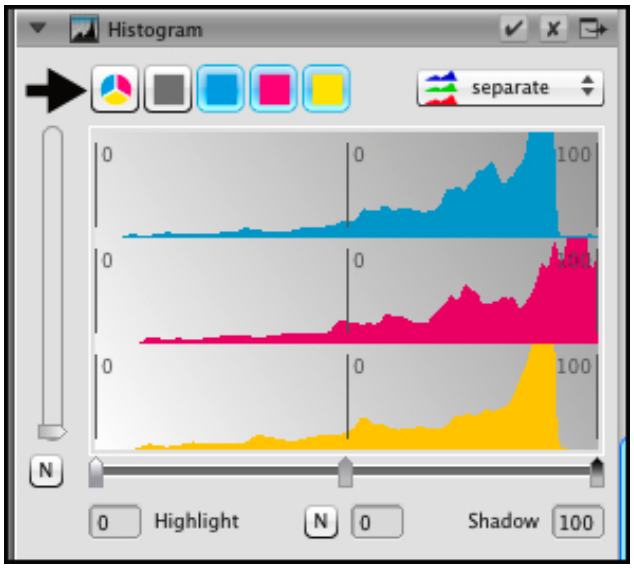


Figure 8.18 CMY Channel Set

Turning to the **Gradation** panel, you can achieve similar effects to those described above using adjustments directly to the tone curves. Firstly, select the curve you wish to adjust by clicking its colour icon in the row of icons just above the graph.

Starting with the sliders under the graph and using the red channel, for example:

- Shifting the midtone slider to the left darkens the selected colour and reveals its opposite (similar to Figure 8.16);
- Shifting the midtone slider to the right brightens the selected colour and reinforces it (similar to Figure 8.16);

- Shifting the contrast slider to the left brightens the selected colour in the dark tones and darkens it in the light tones, thereby reinforcing the selected colour in the dark parts of the image and the opponent colour in the light parts of the image (Figure 8.19, upper panel; red channel selected, therefore cyan is the opponent colour);
- Shifting the contrast slider to the right does the opposite of what is described just above: it lightens the selected colour in the light tones and darkens it in the dark tones, thereby bringing out the selected colour in the light areas of the image, and the opponent colour (cyan) in the dark areas (Figure 8.19, lower panel).

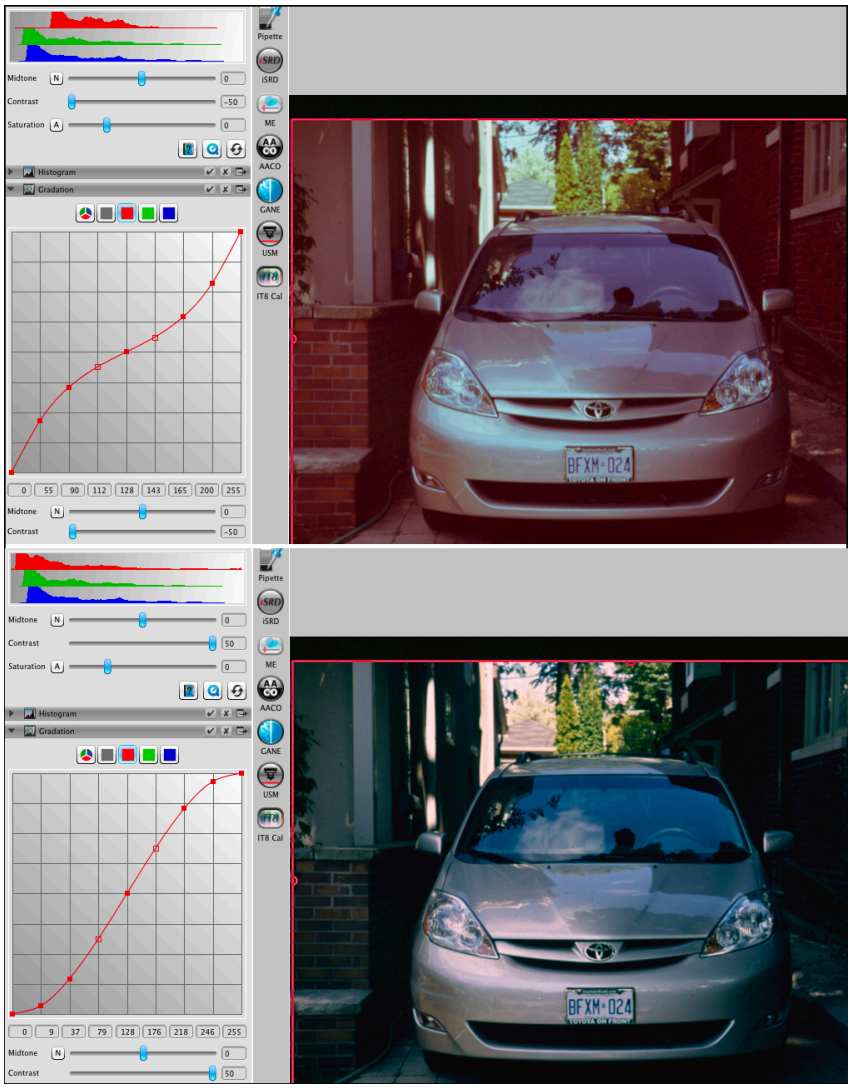


Figure 8.19 Red Channel Edits with the Gradation Tool

This process cannot by itself clip highlights or shadows, because the two curve points are restricted: the upper point cannot shift leftward and the lower point cannot shift rightward. Hence you can see in the lower panel of Figure 8.19 that highlight detail is not nearly as sacrificed as it is in Figure 8.17. This does somewhat

limit the **Gradation** tool's functionality for normalizing the ends of the histogram (anyhow doable with the **Histogram** tool), but it does protect against clipping. The contrast changes in this panel are replicated in the **Output Histogram** (**Picture Settings** panel), as shown in Figure 8.19.

If you have access to the **Expert Settings**, for any one of the colour channels:

- Shifting the highlight slider to the left brings out the opponent colour in the highlights and shifting it to the right strengthens the selected colour;
- Shifting the shadow slider to the left strengthens the selected colour, shifting it to the right brings out the opponent colour;
- Shifting the brightness slider to the left darkens the selected colour thereby bringing out the opponent colour, while shifting it to the right strengthens the selected colour. Be careful using this one: it can suppress highlight or shadow detail in the selected channel moving it too far to the right or the left.

You may also implement adjustments directly on the curve, or enter numbers in the boxes just below the graph to shift the corresponding curve points where desired.

As I mentioned for the **Histogram** controls, these changes affect not only colour, but also luminosity, hence it is important to keep your eye on the histogram in the **Picture Settings** panel and watch for any excessive changes of tonal values at either end of the tone range.

I remind you here again, that by scanning to HDR, any of these effects can be done and redone in SilverFast HDR without the need for rescanning the media.

8.5 Salvaging an Aged Wreck with SCC and the Neutral Pipette

As I was combing through my archive of colour slides looking for useful demo material, I found this photo shot in Zanzibar in 1970 on Agfachrome. Over the years, even in dark storage, the dyes faded, the sky now has a cyan tint, and the rest of the image a mild magenta tint (Figure 8.20 left-side photo). Hence three adjustments were necessary: the colours restored, the sky returned to a more natural sky blue and the rest of the image colour-balanced. All three tasks were easily handled between the **Neutral Pipette** and the **SCC toolset**, yielding the outcome in Figure 8.20, right-side photo.

Figure 8.20 ACR Exercise

Here's what I did **step-by-step**:

1. Rebalance the colour by clicking the **Neutral Pipette** on the pavement and on a cloud. After doing this, the magenta tint was gone, but the cyan sky remained.
2. Increase the **ACR** (Adaptive Colour Restoration) slider from **0** to **40** (Figure 8.20, Lower left panel, red arrow). This brought vibrancy back to the photo, but it also overly darkened the gown worn by the lady in the foreground. I'll revert to that issue below.
3. On the colour wheel, I clicked on a cloudless area of the sky. The tool selected cyan (Figure 8.20, lower panel, black slice). I restored it to blue by clicking the small dot on the inner circle opposite blue, dragging it toward blue on the outer circle, until the shade of sky blue looked satisfactory.
4. To restore luminance to the gown, I created a second layer, and with the pen tool in path mode I drew a path encompassing the gown (Figure 8.21 orange arrow). I clicked on the gown, which set the selected colour on the colour wheel to blue. Then I simply lightened the blue by clicking the blue square on the **L** bar and dragging it upward (Figure 8.21, red arrow and red oval) until satisfied with the blue luminance of the gown. The layer mask confined the adjustment of blue to the gown without further affecting the sky.

The result is a restored and rebalanced photograph (Figure 8.20, far right panel). This little exercise shows how the tools can be targeted to distinct problem areas in photos needing different kinds of possibly conflicting corrections.

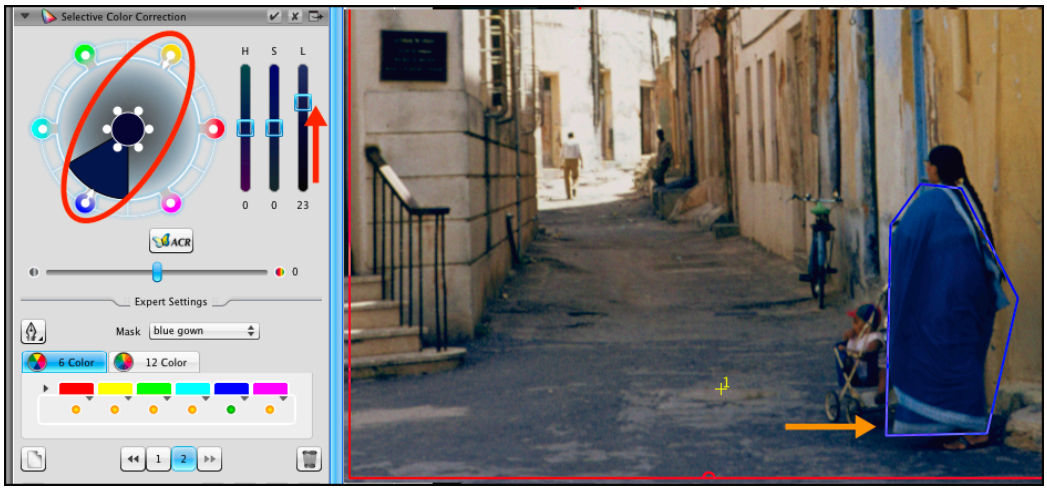


Figure 8.21 Use of Layer Mask to Lighten the Gown

Chapter Nine
Conversions

Colour to Black and White (B&W)

Colour Negative to Colour Positive

Colour to B&W

There are two most recommended workflow options for these conversions:

(i) Within SF8;
(ii) In an external image editor (such as Lightroom or Photoshop).

9.1 (i) Colour to B&W within SF8

The most limited way to do this conversion is to desaturate the photo by shifting the **Saturation** slider completely to the left in the **Picture Settings** panel. It does produce a completely neutral conversion, but there is comparatively little you can do with it either in SF8 or in an external editor.

You can adjust tonality with the gradation curve and histogram tools in SilverFast, Photoshop and Lightroom, but you cannot alter the tint or temperature from neutral in any of these applications, except for adjusting individual colour channels in Photoshop using a Curves Adjustment Layer or the Channel Mixer. This approach does not lend itself to localized tonality adjustments by colour group.

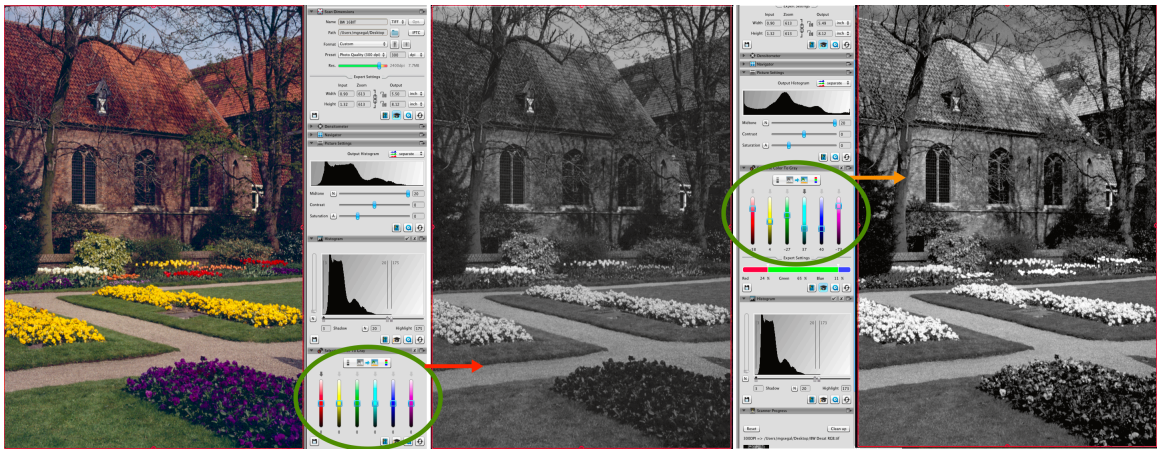


Figure 9.1 Conversion to B&W by 16-bit and SC2G Edits

The preferred way to do this conversion within SF8 is by defining the image as a **16-bit** scan type in the scan type selector (top row of icons in the Dock, third icon from the left – click and select 16 bit). This converts the image to grayscale – but not quite – the underlying colour information is still there "under-the-hood", at least while within SF8 (Figure 9.1).

I selected the photo in Figure 9.1 because it has two characteristics of interest to the demonstration here: (i) without colour it's rather dull, and (ii) it contains substantial amounts of the key colour groups I normally work with: red, yellow, blue, green, orange, magenta/purple.

Once the conversion is made, you have two basic adjustment options: (i) using the **Gradient** and **Histogram** panels for conventional, global tone editing, and/or (ii) using the **SC2G** panel for selective tone editing by colour group. Both are useful, but the kind of changes you can make with the latter are particularly interesting.

The **Histogram** and the **Gradation** panels allow the same luminosity adjustments and work the same way in B&W as they do in colour, so I won't repeat instructions in Chapter Seven for using them here, except to note that because you have made a conversion to 16-bit, you only get the one grayscale luminosity channel.

However, adjusting localized tonality in the **SCC to Gray** (**SC2G**) panel is different and deserves explanation. After you select the 16-bit image format, click on the icon for the **SC2G** panel (same location as was the **SCC** icon for 48-bit images); it will open in the Dock (Figure 9.1, identified by the green oval). You will see six sliders, one for each of the R, G, B, C, M, and Y colours. By clicking and dragging the blue squares on each of these columns you will lighten or darken the colours underlying the B&W conversion, giving the image very customized luminosity by colour group. Starting from the middle (zero) position, raising a slider brightens gray related to its underlying colour, lowering a slider darkens gray related to its underlying colour (ignore the fact that the numbers below these bars turn negative for colours being brightened and positive for colours being darkened).

To see how this works in Figure 9.1 (far right panel), my objectives were to draw the eye to the building by livening it up and disentangling it from the sky and the surrounding foliage, and to give the garden some of the eye appeal it lost when the colour disappeared. (The grayscale tonal differences between converted yellow, green and purple in the center panel B&W rendition look much less exciting than the contrasting colour differences in the colour version of the left panel. This is a common occurrence when converting photos from colour to grayscale.)

The building and the roof are reddish/orange, so I grabbed the slider for the red group in the **SC2G** panel and dragged it upward till the building became bright enough. Then I more mildly brightened green both to breathe some life into the foreground and to better separate the front from the back bushes in front of the building. Then I darkened cyan and blue to make the sky more dramatic and to give it more contrast relative to the building. I brightened magenta to liven-up the purple flowers in the right corner foreground and better separate them from the grass.

You can see from the **SC2G** control panel that each colour group is independently adjusted to a different extent in order to achieve the desired tonal effects. There's no

question that the far right interpretation (Figure 9.1) is a more visually appealing image than the center one. This could not have been accomplished to the same extent with the histogram and tone curve alone.

If you scanned this image to SilverFast HDR, by selecting – in SF8 - **16-bit HDR** as the scan type, you could reopen the image in SilverFast **HDR** and make tonal adjustments with no need to rescan the image – but **SC2G** will not be available in the **HDR** application (because it was scanned as a one channel grayscale in SF8 and loses the underlying colour information once it leaves SF8). If you want the ability to convert to grayscale and use **SC2G** in the **HDR** application, you would scan the image in SF8 as a **48-bit HDR** or **64-bit HDRi** colour scan, then open it in **HDR**, select **16-bit** as the file type, and then click on the **SC2G** icon for adjusting grayscale tonality by colour group. I demonstrate how this works in SilverFast **HDR** (Figure 9.1a, but you can do it in SF8 as well), using this **step-by-step** procedure:

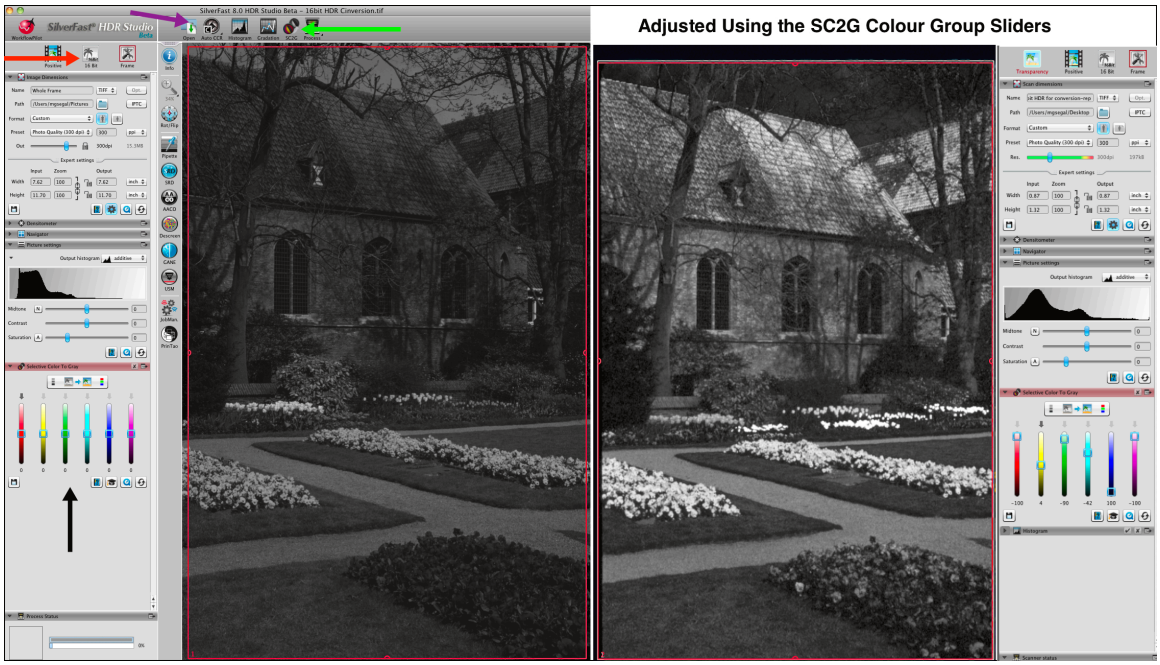


Figure 9.1a Selective Color to Gray in SilverFast HDR

- Scan the image as a **48-bit HDR** or **64 bit HDRi** colour file in SF8 to a folder of your choosing.

- Open SilverFast **HDR** and click on the **Open** icon (Figure 9,1a left panel, purple arrow). Migrate to the folder to which you scanned the image, select it, click on the image you wish to open and in the finder window click **Open**. The image opens in SilverFast HDR.

- Change the Scan Type to **16-bit** (Figure 9.1a left panel, red arrow).

- Click open **SC2G** (Figure 9.1a left panel, green arrow). The SC2G panel opens in the Dock (Figure 9.1a left arrow, black arrow).

- Make the tone adjustments you want in this panel, as described above for doing the same process described above in relation to Figure 9.1.

In the right panel of Figure 9.1a, I show the results of making such adjustments in **SC2G**. I took some artistic liberty to dramatize the image by darkening the sky (blue slider to the bottom in Figure 9.1a right panel), brightening the purple flowers in the foreground (purple slider shifted upward), brightening the grass (green and cyan sliders upward), and brightening the building (red slider shifted upward). When I implemented this latter move, the yellow flowers suffered saturation clipping (loss of highlight tones, because yellow become over-saturated – remember, the component colours of yellow are red and green). To bring these flowers back into the tonal range, I darkened yellow by shifting the yellow slider downward.

Once this image is scanned and opened in an external editor, it will be a grayscale image with no editing capability by colour channel (there will be none) or by colour group.

Black and White Image Toning in SF 8 and SilverFast HDR:

If you wish to tone a B&W conversion within the SilverFast family, you need the **SilverFast HDR** application, and you would implement the following **step-by-step:**

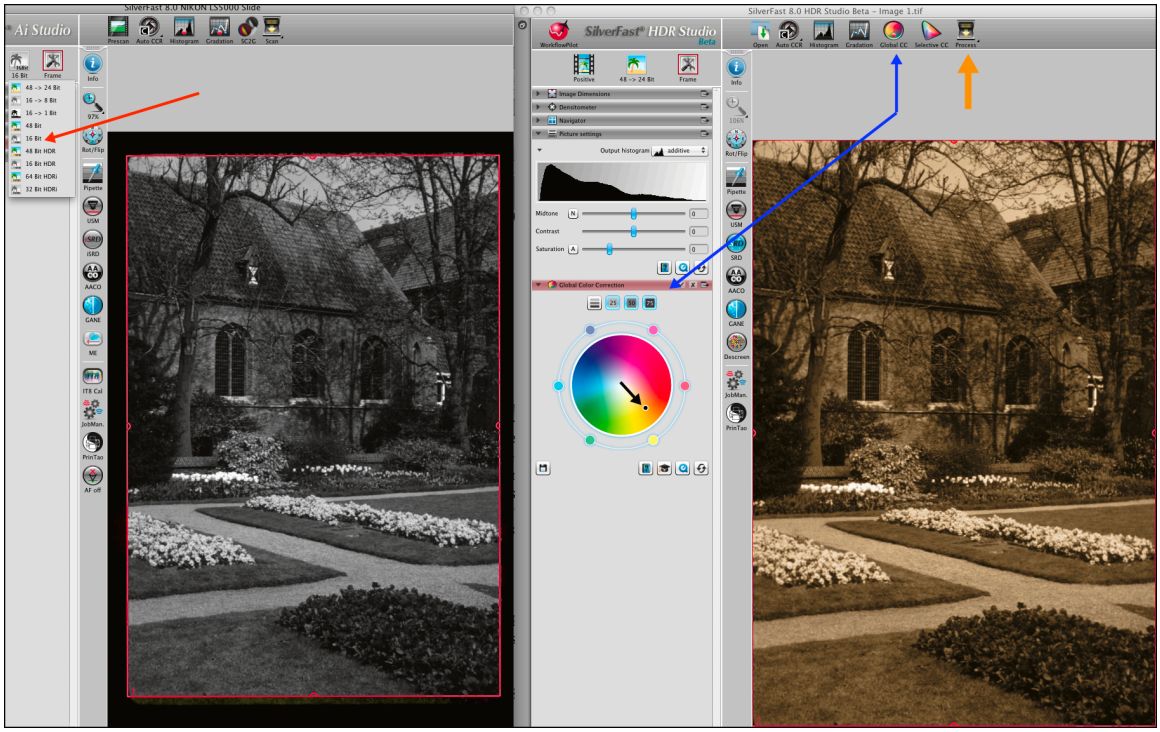


Figure 9.1B Toning a B&W Image in SilverFast HDR

i. In **SF8** select **16 bit** as the image output format by clicking on the **Output Format** button (to the left of the **Frame** button) and, from the drop-down menu, select **16 bit** (Figure 9.1b, red arrow). Do **not** select **16 bit HDR**.
ii. Make all the image edits you want in SF8 using **Scan Dimensions, Histogram, Gradation, SC2G**, etc.
iii. Scan the image.
iv. Open the image in **SilverFast HDR,** in one of the RGB output formats.
v. Open the **Global Color Correction tool** (Figure 9.1b, blue arrow). **GCC** opens in the dock, displaying the colour wheel.
vi. Click and drag the black dot from the center of the colour wheel into the hue you wish to use for toning the image (Figure 9.1b, black arrow). Here I made it sepia by moving the black dot into the deep orange zone (between red and yellow).
vii. Process the image by clicking the Process button at the end of toolbar (Figure 9.1b, orange arrow).

9.2 (ii) Conversion in an External Image Editor

For this workflow, I recommend that you optimize the image as a normal 48-bit RGB photograph in SF8, scan it to a folder on your hard-drive and open it in either Lightroom or Photoshop as described in the workflow set-ups in Chapter Two or Chapter Ten. Here I show the adjustments first for Lightroom, then for Photoshop.

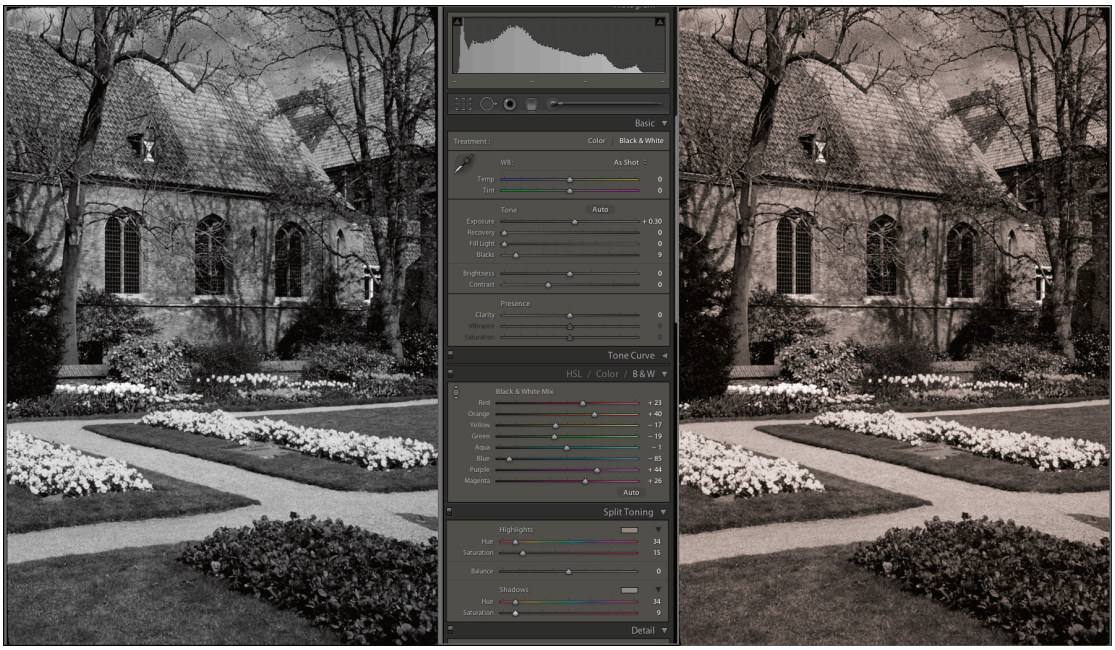


Figure 9.2 B&W Conversion and Toning in Lightroom 3.4

In Lightroom: select the **Develop** module, inspect the histogram for adjustments to overall luminosity, then scroll down the panels in the right column to the **HSL/Color/B&W** panel. Click on **B&W**. This will convert the image to B&W (never

permanently) and give you eight colour sliders with which to adjust localized tonality by colour group, much as I showed above in the SF8 **SC2G** panel. You may also of course make any other image edits you want within Lightroom – including toning or even split-toning your B&W conversion (Figure 9.2, where I used **Hue 34** and **Saturation 15** for the highlights and **9** for the shadows, a subtle split-tone).

In Photoshop: Add a Black & White Adjustment Layer to the RGB image. This will "convert" it to B&W (not really a conversion, because switching off the Adjustment Layer reverts it to a full colour photograph). It provides similar capabilities for localized adjustment I mention just above in the context of Lightroom; however, instead of eight colours to adjust, there are six, and there is no split-toning capability within this Adjustment Layer. As in Lightroom, whilst in Photoshop you may make whatever other image adjustments you require.

The key advantage of a B&W workflow in Photoshop and Lightroom is that you retain full flexibility to revert the image back and forth between colour and B&W in the same image file. To preserve those alternatives in an SF8 workflow, you would need to make two scans: one in **16-bit** mode for grayscale and one in 48-bit RGB or one of the other colour modes for the colour photo. However if you scan in **48-bit HDR** or **64-bit HDRi** modes, the **HDR** file may also be opened in SilverFast HDR and converted back and forth between colour and grayscale inside that application.

9.3 Colour Negative to Positive (Appendix 4 discusses grayscale negatives.)

Some practitioners think the optimal way of scanning colour negatives is to minimize editing intervention at the scan stage by scanning exactly what the scanner produces unaltered (I'll call it "pass-through"), then opening the image in Photoshop, converting it to a positive and making other adjustments as needed. Stated advantages of this workflow are that no data gets altered or destroyed on the way to Photoshop and there is no need to bother about selecting and possibly re-configuring conversion profiles in the scanning software appropriate for the brand of negative film one is scanning.

There are three big issues doing without the negative profiles in the scanning software. Firstly the film has an "orange" mask (or some other hue) that causes compressed contrast and a colour cast; the contrast compression needs compensation and the colour cast must be eliminated. Secondly, because of the contrast compression, scans of negatives tend to come out of the pass-through process rather flat and lifeless. Thirdly, the colours need to be inverted. These issues need to be corrected somewhere.

Using SF8, the default option is to use **NegaFix**. You select the closest **NegaFix** profile for the film you are scanning, (in **Ai Studio**) tweak it a bit if necessary and save that new profile as a Preset for future scanning of the same film stock. Then scan the images in 48-bit mode using the **NegaFix** profile. That's the easy way and it works very well, but there are alternative techniques.

I first present several pass-through variants that start with SF8 but don't use **NegaFix**, then explain the use of **NegaFix**. This way you will gain an appreciation of the principles involved and the way in which **NegaFix** gives you a relatively simple solution. I designate this section as **Only if you need to know…..,** because it covers awkward multi-step processes that you can avoid by using **NegaFix** instead. It carries-on for a number of pages that you can skip if you wish to proceed directly to **NegaFix** – the section titled **The Easy Way – Maximum Use of SF8 Tools**.

9.3.1 The Non-NegaFix Workflows

Procedure step-by-step

This is a three-stage procedure, which uses SF8 and SilverFast HDR for the first two stages.

Stage One: Isolate the L*a*b* value of the orange mask.
Stage Two: Scan your photograph.
Stage Three: Process the image into a positive in Photoshop.

Stage One: Getting the L*a*b* Value of the Orange Mask

(1) Find a frame-size piece of unexposed, but developed, negative film of the same stock used for the photographs you will be scanning.

(2) In SF8, configure the job as a Negative Transparency scan (Figure 9.3)

Figure 9.3 Scan Set-Up for Orange Mask

(3) In SF8, select the Scan Type as **64-bit HDRi** (Figure 9.3). This will turn-off all adjustments, and, for colour images, allow you to clean dust and dirt using the

infrared channel (in supported scanners) in the next stage. The size and resolution of this scan doesn't matter. If your scanner does not support access to an infrared channel, select the **48-bit HDR** Scan Type. To complete the set-up, in **Preferences>General**, select a Gamma of 2.2 and check the box **for HDR Output**. This helps to mitigate the usually excessive flatness of HDR scans (Figure 9.3).

(4) Give the scan a name, press **Scan** and save the scan to your hard-drive wherever you prefer to keep it.

(5) Quit SF8, and open SilverFast **HDR**. Click on the Open icon (Figure 9,1a left panel, purple arrow), and scroll to the folder where you saved the scan from step 4.

(6) Select the appropriate folder and file and click **Open** in the Finder (Explorer) menu.

(7) Set the job type in SilverFast **HDR** to **Positive** (Figure 9.4) and **48-bit HDR**.

Figure 9.4 Scan Type for Negative to Positive in SilverFast HDR

(8) Before going further make sure the original media is as clean as possible to prevent artifacts from possibly falsifying the reading of its L*a*b* value.

(9) In **Scan Dimensions**, give the file an altered name (e.g., put **PRC** – for **processed** - at the end of the file name) and select the folder where you wish to store it.

(10) Press **Process** and save this image to your hard-drive. (Figures 9.5 and 9.6)

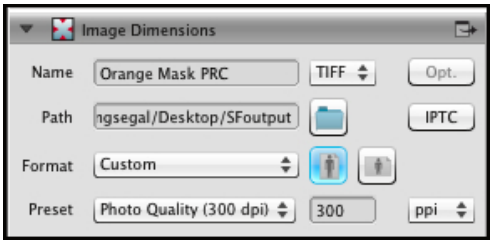


Figure 9.5 Rename for HDR Processing

Figure 9.6 Process the Scan in HDR

(11) Open the scan in Photoshop. It should be tagged with your scanner profile (Chapter Three). Convert the scan to Adobe RGB(98) (**Edit>Convert to Profile**)..

(12) Duplicate the Background layer (**CMD/CTRL J**).

(13) Go to **Filter>Blur>Average** and accept it. Then **Flatten** the image. This will ensure that the colour value of the whole image is uniform.

(14) Select the Second Color Readout on your **Info** Panel to be **Lab**, run your eyedropper over the image and note its L*a*b* value. For example, the film I'm using in this demonstration has an L*a*b* value of 78,14,9. That's the colour of the orange mask as rendered by SilverFast in HDR mode.

You are now finished deriving the tone and colour of the orange mask for purposes of Stage 2. You will not need to repeat this process of determining the L*a*b* value of the orange mask for all scans from the same scanner, film stock and film development conditions (process, place and time). If you change any of these "initial conditions", you will need to repeat it with film comprising new conditions.

Stage 2: Scan Your Photograph

(15) Repeat Stage 1 steps (2) to (11) inclusive on the photo whose negative you wish to scan.

Stage 3: Process the Image in Photoshop

(16) Open the image in Photoshop, where it should be a 16-bit TIF file showing a negative image of your photo.

(17) Add a Color Fill Layer (**Layer>New Fill Layer>Solid Color**) and in the color picker dialog that opens, enter the L*a*b* value of the orange mask noted in step (14) above (Figure 9.7, red arrows and box).

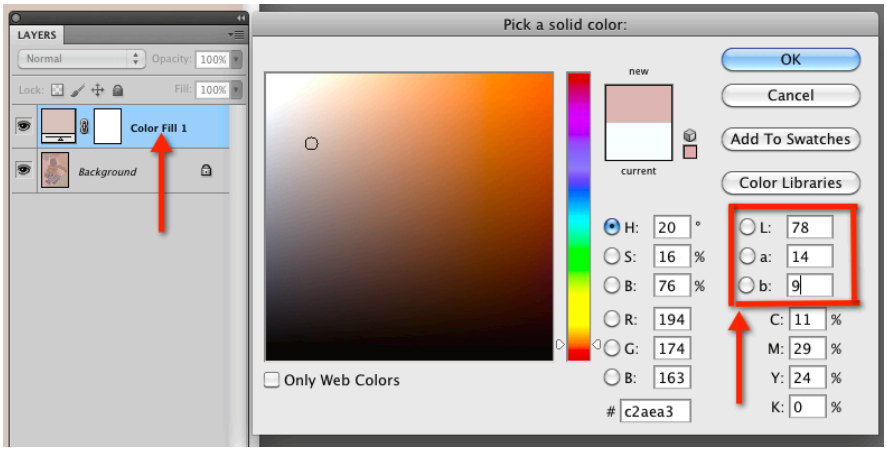


Figure 9.7 Color Picker, Orange Mask

(18) Change the Blend Mode of this **Color Fill** Layer to **Difference** and flatten the image. Your photo will now appear as a de-masked positive with no adjustments and looking rather dark (Figure 9.8).

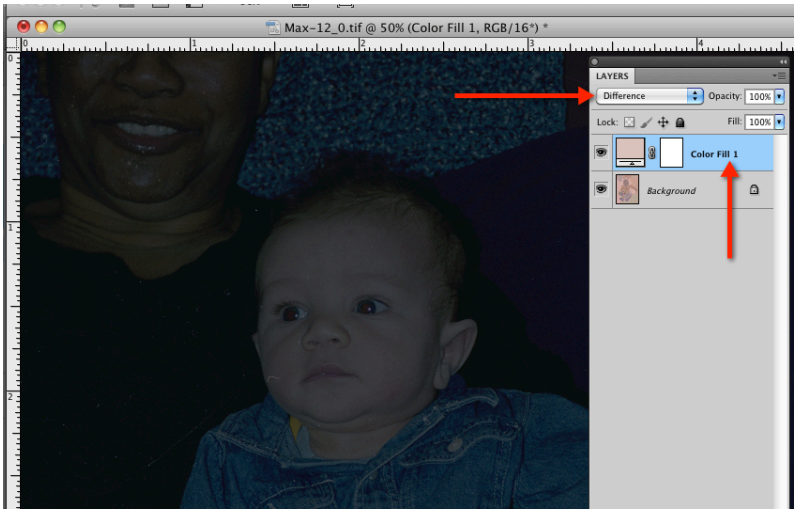
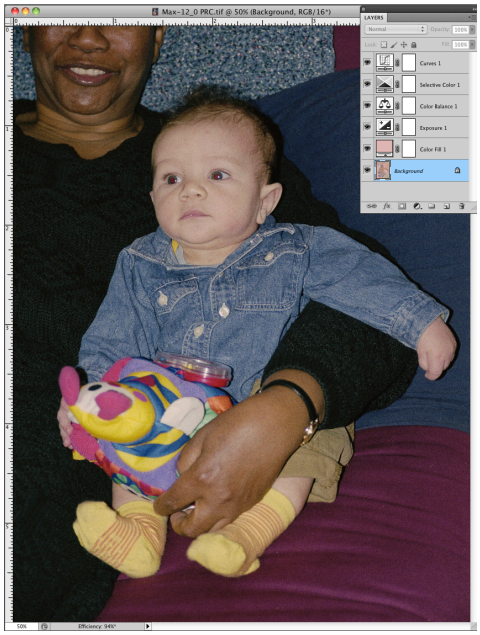


Figure 9.8 Unadjusted Scan Procedure 1

(19) At this stage I recommend adding a duplicate image layer and doing any grain reduction and "capture sharpening" you wish now.

(20) Add an **Exposure Adjustment Layer** and adjust the **Exposure** and **Gamma** sliders until the image has approximately the right brightness and contrast. Do any further adjustments to taste (Figure 9.9).



9.9 Exposure Adjusted

Stage 3 Alternative (A) – Use SilverFast HDR in Negative Mode, not Photoshop, to Process the Image:

(16A) Implement Step (15) by doing Stage 1 steps (2) to (9) inclusive, except in Step (7) change the Transparency type to **Negative**, and in Step 9, select **48-bit Color**.

(17A) Before you proceed to **Process** the scan, implement any image adjustments of tone and colour you wish in SilverFast HDR, change the file name, then Click on **Process**.

(18A) If you wish to do further work in Photoshop, open the processed scan in Photoshop and proceed.

You can see from Figure 9.10 that these two Stage 3 alternatives can produce very similar results. I only converged them enough to see that with more time and fiddling, I could get them very close indeed. In SilverFast HDR the processed image is a 16-bit per channel TIFF with no layers. As well, if you don't like what you did, you can revert to SilverFast HDR and re-adjust it as much and as often as you like without rescanning it. As long as you revert to the original HDR scan, you may rework the image starting from settings saved for that image in SilverFast HDR, safe enough from visible information loss in a 48-bit image scan. In Photoshop, the use of Adjustment Layers and layers assures reversibility.

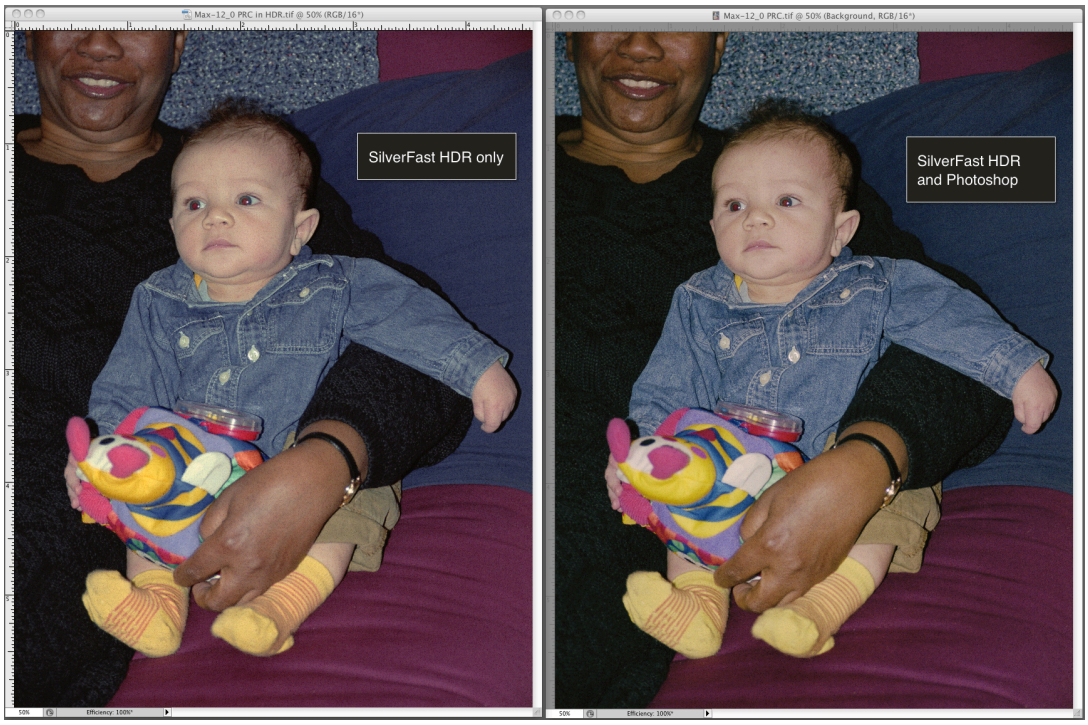


Figure 9.10 Process in SilverFast HDR

Stage 3 Alternative (B) – Use SilverFast HDR in Positive to Negative Mode

(16B) Implement Step (15) by doing Stage 1 steps (2) to (9) inclusive, except in Step (2) change the **Transparency** type to **Positive**, in Step (7) set the job type as **Transparency Negative**, and in Step 9, select **48-bit Color**.

(17B) Before you proceed to **Process** the scan, implement any image adjustments of tone and colour you wish in SilverFast HDR, change the file name, then Click on **Process**.

You will find that this yields a satisfactory conversion, with far less work and smaller file size than its Photoshop comparator (Figure 9.11). Here again, colour balance differs a bit, but they could be brought closer with more work.

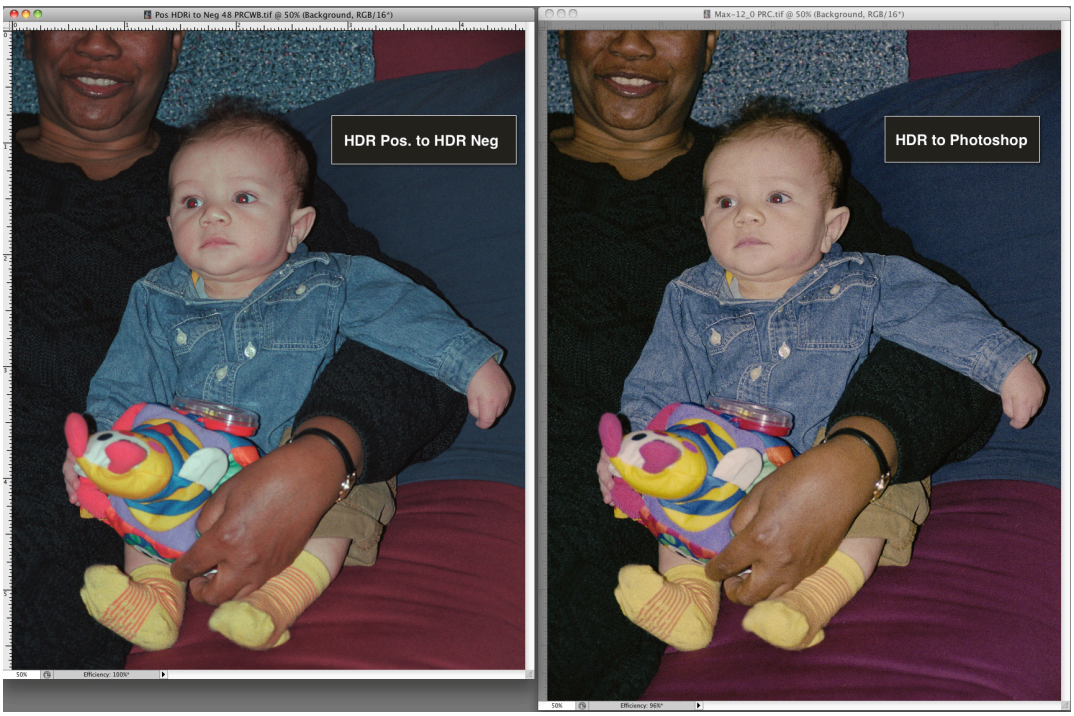


Figure 9.11 SilverFast HDR or Photoshop

The Shaken-Down Approach:

Many steps in the first procedure above to send an unadjusted negative scan for processing in Photoshop can be avoided by doing something much simpler, provided your image frame includes a bit of unexposed negative material within it.

The steps are as follows:

(a) Implement above Steps (2) to (10) inclusive using the negative of your photo with some unexposed negative material included in the scan frame.

(b) Open the image in Photoshop, where it will be a negative.

(c) Make a duplicate image layer (**CMD/CTRL J**).

(d) Invert it (**CMD/CTRL I**)

(e) Add a **Curves Adjustment Layer** clipped to the duplicate image layer and change the Blend Mode to **Color** (Figure 9.12A, orange arrow).

(f) Use the Black eyedropper (Figure 9.12A, red arrow) and click it on the unexposed film strip (Figure 9.12A, green arrow). This removes the orange mask and creates a black point for scaling the colour. The image starts-out looking flat and dull, but can be adjusted in Photoshop, especially by adding a new **Curves Adjustment Layer** in **Normal** Mode and adjusting the black and white points. Figures 9.12A and 9.12B show it before and after further adjustment.

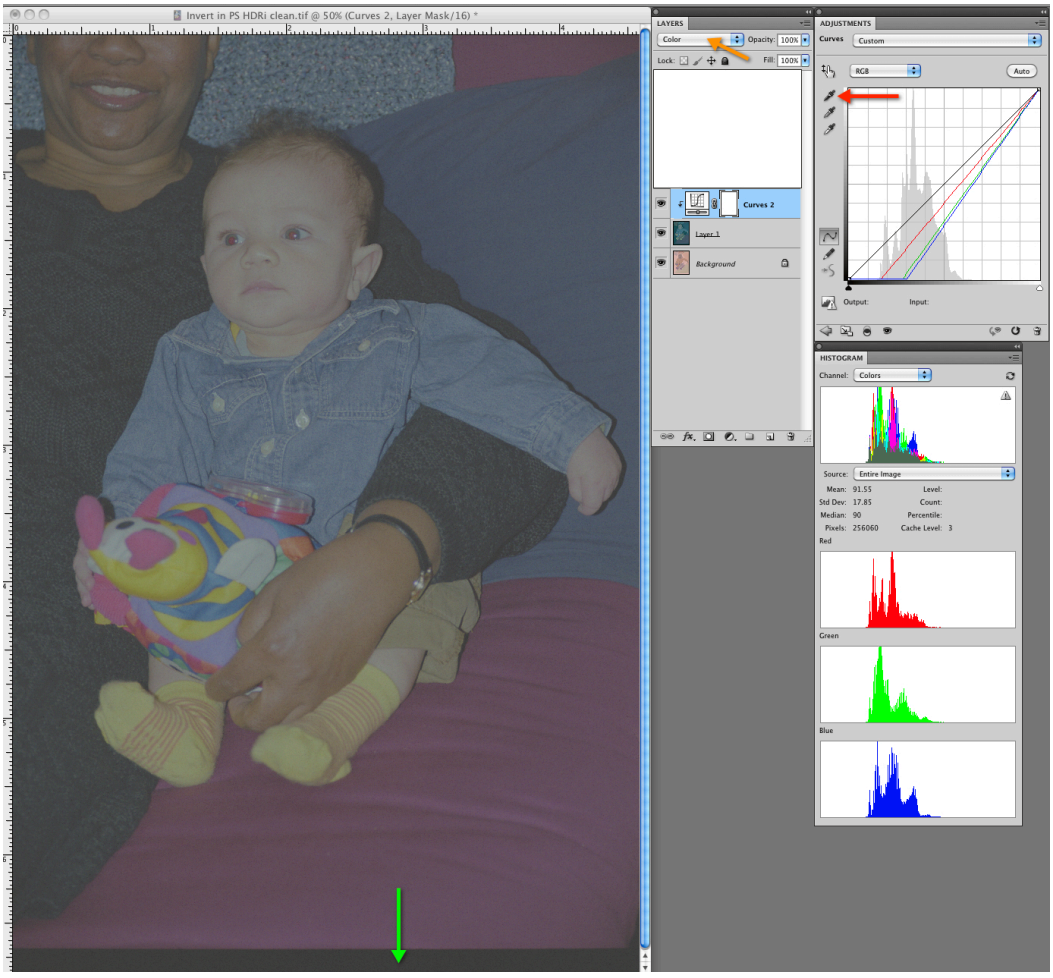


Figure 9.12A Simplified Orange Mask Detection

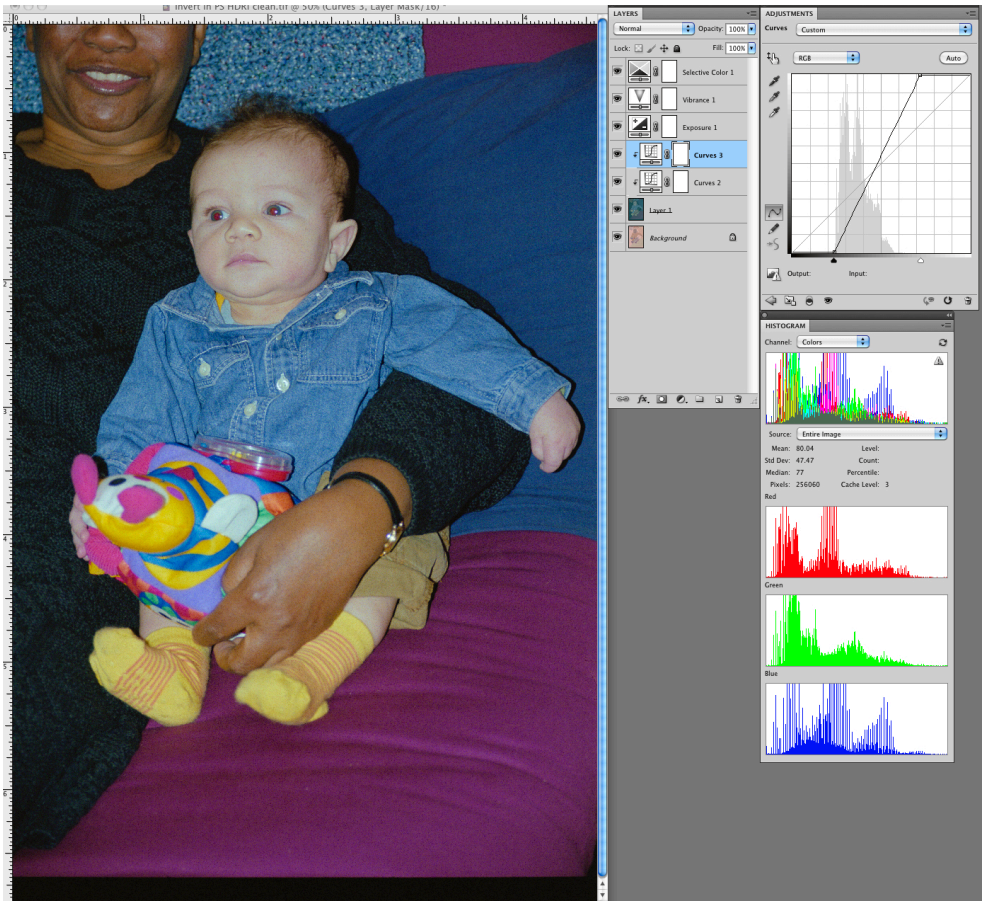


Figure 9.12B – 9.12A After Adjustment

This approach may be less satisfactory than some others, because it can require quite a number of subsequent adjustments to knock the image into acceptable tone and colour, as seen in Figure 9.12B. You should be working all of these procedures in 16-bit depth so that the rather massive editing moves these processes require do not create visible discontinuities of tone and colour in the image, as one could imagine happening simply by looking at the gaps in the Photoshop histograms, which are 8-bit portrayals (for conveying information conveniently). Working in 16-bit depth will prevent these discontinuities from being visible in the image.

An alternative approach after step (b) above is to do as follows:

(c1) add a **Curves Adjustment Layer**;
(d1) use the White eyedropper on the blank negative space to set a white point;
(e1) create a **Merge** Layer of the Background and the Curves Adjustment Layer by selecting them both and doing **CMD-OPT-SHIFT-E** (Mac) or **CTRL-ALT-SHIFT-E** (PC);
(f1) invert the Merge Layer (**CMD/CTRL I**) and make further adjustments.

This also produces a usable positive result (Figures 9.13 and 9.14).

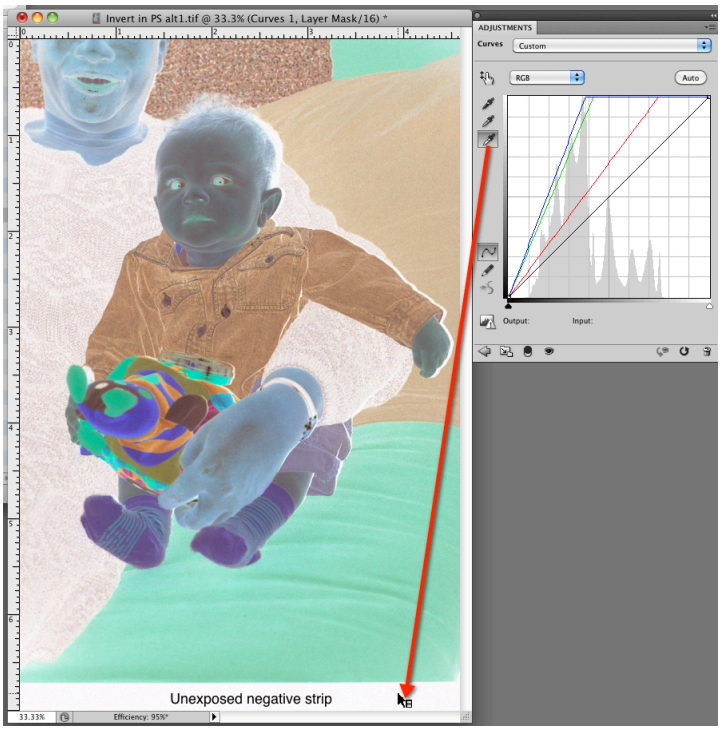


Figure 9.13 (steps c1, d1)

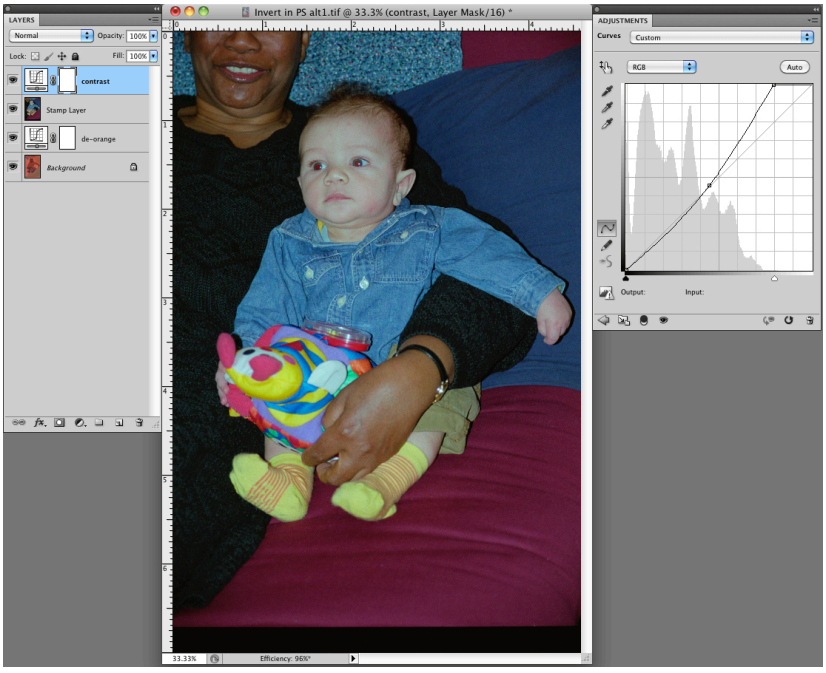


Figure 9.14 (steps e1, F1)

Using either of these "simplified" procedures, it can be challenging to knock the image into a satisfactory state of tone and colour, and the outcomes may or may not be totally satisfying.

9.3.2. The Easy Way – Maximum Use of SF8 Tools:

Compared with everything discussed about this subject above, I find it much easier and fully satisfactory to use SF8's **NegaFix** tools for scanning a negative into a positive digital image. To use **NegaFix**, here is the **step-by-step**.

(1) Once you select **Transparency, Negative** as the scan type, **NegaFix** opens into the Dock, (Figure 9.15). **NegaFix** contains a set of about 127 different profiles for various brands, subtypes and ISO speeds of negative films (legacy and current). Select the **NegaFix** configuration corresponding with your film (if it is not a rebranded version). If the one corresponding with your film gives you a less than satisfactory positive based on your knowledge of the image, try any other profile to see whether another one works better. This happens. If your film is rebranded, select the **NegaFix** profile which makes the image look best to you. As long as you find a **NegaFix** profile that makes the conversion look satisfactory, the conversion is complete.

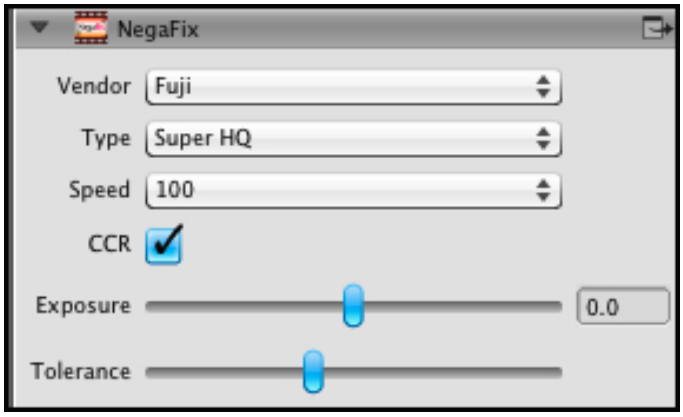


Figure 9.15 NegaFix Film Selector

(2) It is quite possible that no negative profile will automatically optimize your images, even if the capture conditions included good exposure and colour balance. The conditions of film storage, development and other factors cause variance of outcomes relative to the test conditions in which LaserSoft Imaging configured these profiles. Hence you may need to "tweak" the most suitable **NegaFix** profile you selected. In the **Ai Studio** version, SF8 provides a very effective toolset for adjusting **NegaFix** profiles and saving them as new profiles for your own use.

(3) To tweak a **NegaFix** profile, first please check that the **CCR** box is enabled by clicking on it to place a check mark (Figure 9.15). It will turn blue when activated. This enables automatic removal of a colour cast.

(4) If this is not adequate, next assess what aspects of the negative to positive conversion need correction. If you think it is mainly a matter of exposure, use the **Exposure** slider (by clicking and dragging its handle) immediately under the film selection panes (figure 9.15). The functioning of this slider is counter-intuitive – so

beware. When you shift it leftward you will see negative numbers in the box to the right of the slider, and the image darkens. When you shift it rightward, the numbers turn positive and the image brightens.

(5) If you think the overall colour balance may be an issue, try adjusting the **Tolerance** slider (by clicking and dragging its handle) – this adjusts compensation for the orange mask based on measurements taken of the highlights (Figure 9.15). It operates on the blue-yellow axis of the colour spectrum. When you shift it rightward it adds a warming effect and when you shift it leftward it adds a cooling effect. Most of the time, these adjustments are all that is needed, but there are **Expert** tools available for taking this further, **only if you really need to know…..**

(6) If these adjustments don't suffice, more detailed editing is available in the **NegaFix Expert Settings**, where you have the individual RGB tone curves (**Curves** tab) underlying the profile's behaviour (Figure 9.16). You may reshape these curves to produce the tonal properties and colour balance you prefer, and use the **Expansion** tab for further refinement of orange mask removal.

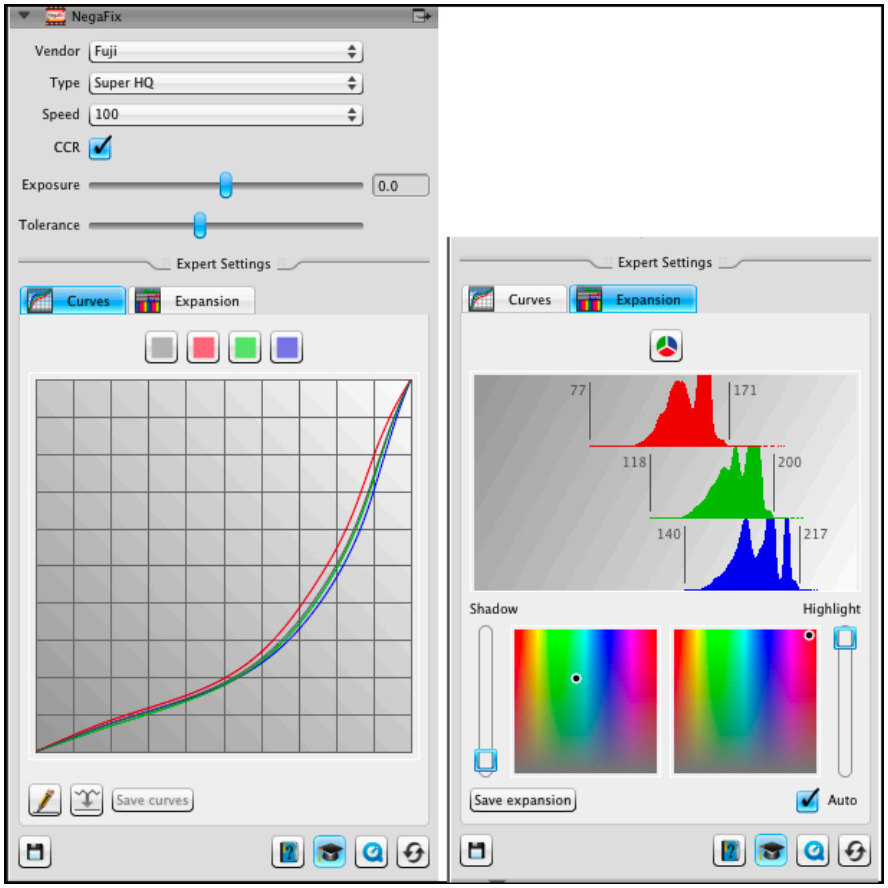


Figure 9.16 NegaFix Profile Editing Tools; left Curves, right Expansion

I'll first explore tonal adjustment, then colour adjustment.

(7) The same tonal and colour editing principles for **curves** adjustment that I explained in Chapters Seven and Eight for the **Gradation** curve apply here, but the method of using the interface is different. In the example of Figure 9.17, the film is Kodak Gold 200, but the generic Kodak Gold 200 profile produced an over-exposed and under-saturated rendition for this film in the scanner I used (Figure 9.17).

(8) To correct this, I first entered the **Curves** tab (Figure 9.18) and clicked on the gray icon (Figure 9.18, by the black arrow). Then I clicked on the pencil icon in the lower left corner of the panel (Figure 9.18, red arrow). This adds adjustment points to the RGB curve controlling tonality. By clicking and dragging, I shifted several of those points downward a bit (Figure 9.18, green arrows) until the exposure and contrast looked about right – to me (Figure 9.18).

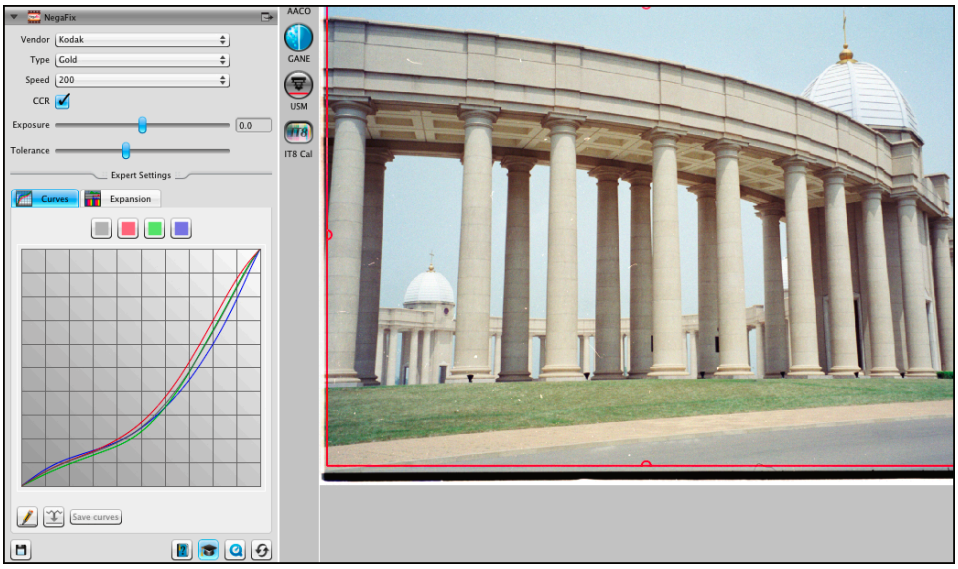


Figure 9.17 Result of Initial NegaFix Profile

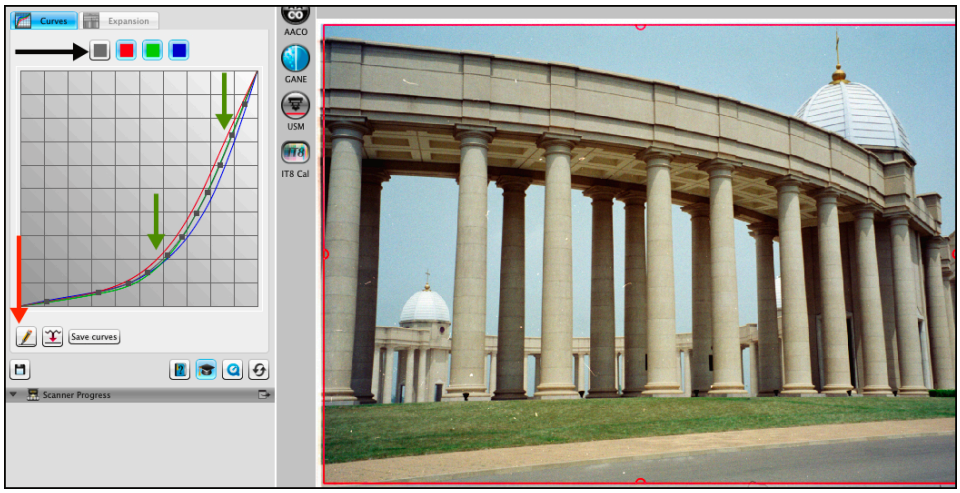


Figure 9.18 Tonal Correction

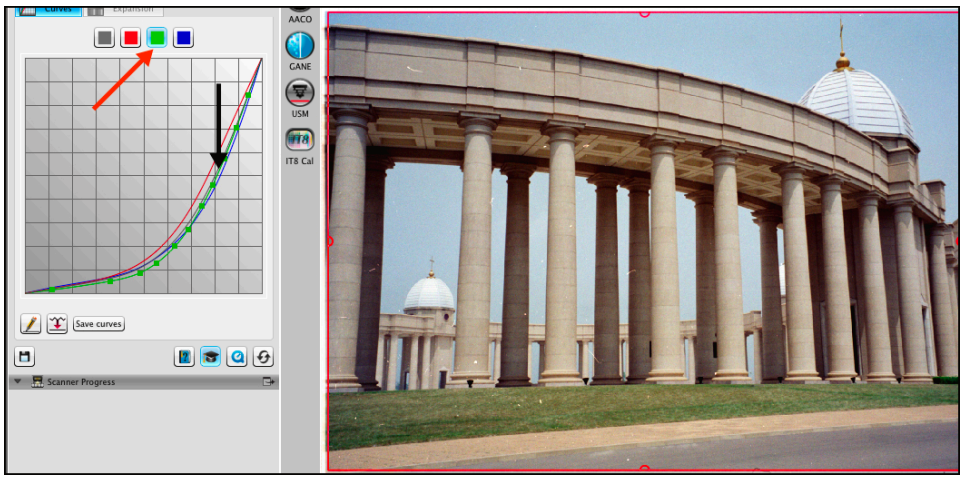


Figure 9.19 Colour Correction

The icon beside the pencil (lower left under the graph) is clickable for "smoothing the curves" in case you produced excessive discontinuity as a result of the curve shape you selected.

(9) Having made the tonal adjustment, I observed both visually and by using the densitometer on supposedly neutral areas (e.g. the domes and the pavement), that there is a slight greenish cast. To correct that, I clicked on the green icon (Figure 9.19, red arrow), which added control points to the green curve. I pulled a couple of those downward a bit to de-emphasize green (Figure 9.19, black arrow), until the result looked about right, and read about right (in the densitometer) from sampling colour values of the high dome. It is just about neutral. Shifting the individual colour channel curves is a finicky operation. Small movements create pronounced colour changes.

(10) There is a more automated way of implementing refined orange mask correction if you can work with an image or a couple of images from the same roll of film containing some small area of reasonably-assured neutral highlights and/or shadows. The **step-by-step** procedure is as follows.

(a) In the **NegaFix Expert Settings** click on the Gray icon above the graph and click on the pencil icon in the lower left corner of the panel (Figure 9.20, red arrows). This will add control points to the RGB curve.

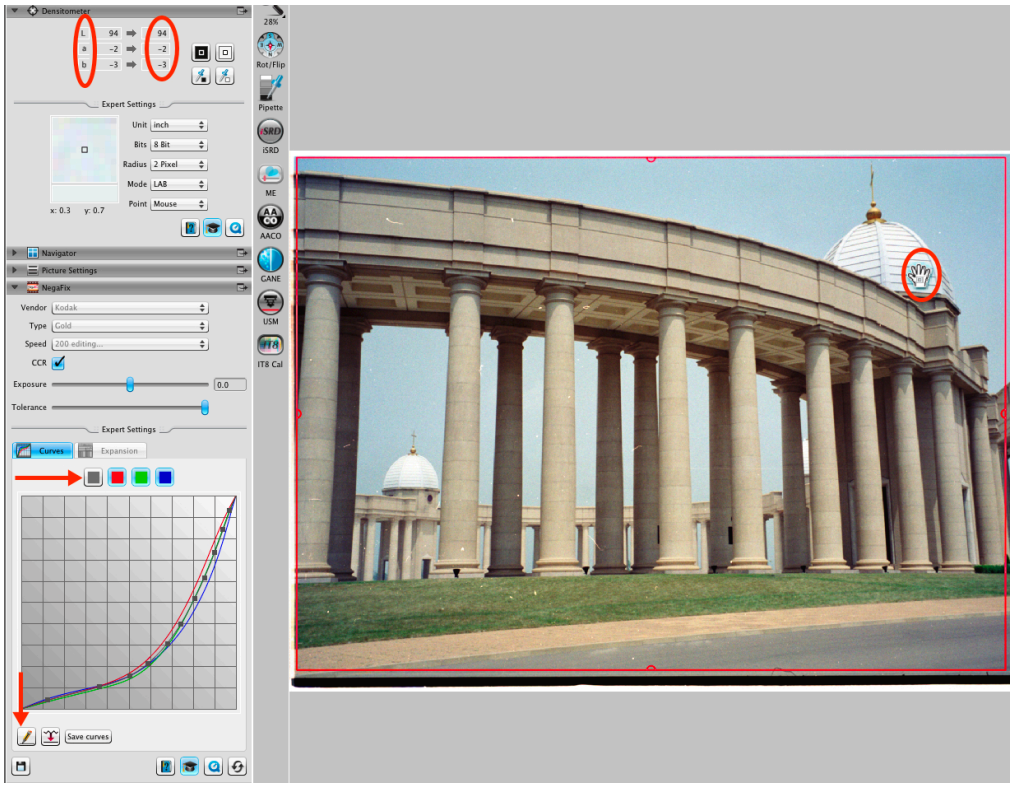


Figure 9.20 Neutralizing Orange Mask - Highlights

(b) Position your cursor on a highlight or shadow area you think should be neutral and observe the colour values in the densitometer (Figure 9.20, red ovals). If the **a** or **b** values are not **0**, the selected point is not neutral.

(c) Click on that point. As soon as you do so, a colour space diagram will appear under the curves graph (Figure 9.21). This graph shows hue angle on the horizontal plane and saturation on the vertical plane. The slider to the right of the colour space is for lightness – the blue square controller (that you can slide up and down) being in the uppermost position indicates that it applies to the highlights. The black dot surrounded by a white circle within the colour space (Figure 9.21 black arrows) shows that the operation you performed by clicking on the selected point in the image (the hand on the dome) has neutralized it by shifting it from blue to neutral.

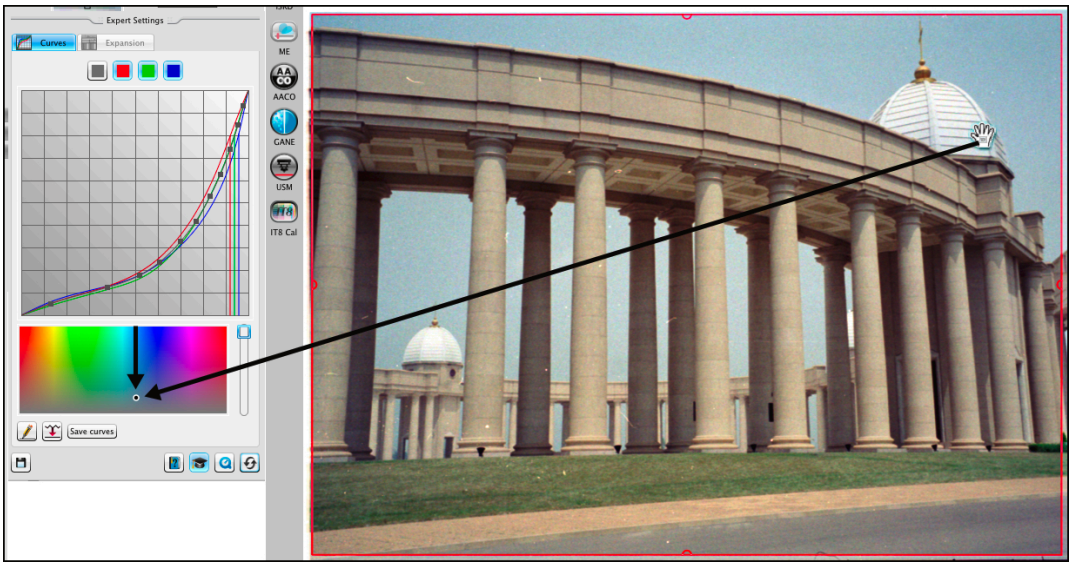


Figure 9.21 Neutralizing Orange Mask – Highlights (2)

The same exercise repeated on the shadows this time shows a reddish cast in the deep shadow area (Figure 9.22, densitometer in the upper left box, Lab colour value in the red oval). Clicking the sampled point resulted in displacing the red colour value to neutral (Figure 9.22, black arrow).

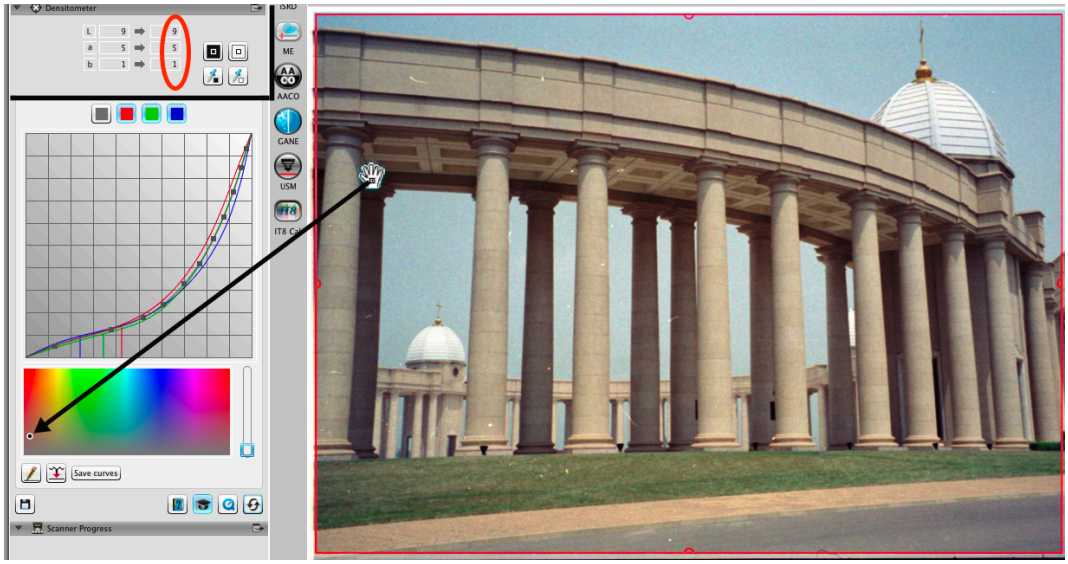


Figure 9.22 Neutralizing Orange Mask - Shadows

Having completed these steps, you have remapped the orange mask in a manner that should neutralize it, provided the sampled points really should be neutral.

I'd like you to notice my choice of words in paragraph (9) "supposedly neutral", "result looked about right", "sampling colour values", and "just about neutral". This reflects a sober truth of the matter when it comes to scanning many of our

memories: the computer program works with mathematical precision, but the media we're scanning and our memories don't.

Unless we were diligent enough to use gray cards, white balance cards or Gretag-MacBeth Color Checkers with every roll of film in those days (and how many of us did or even knew of them?), we really have no idea what is neutral gray in the vast majority of the photos we made. For example, maybe in our minds' eye the dome is supposed to be white, but in a clear daylight sky it actually reflects a bluish light; maybe in our minds' eye the pavement is supposed to be gray, but in reality the material it is made from contains minerals that give-off a reddish reflection. Hard to know for sure what's supposed to be neutral in this image, if any thing.

I mention this to be certain you understand that unless the photograph is made in a scientifically controlled manner from the moment of capture onward, when we adjust these profiles we're dealing in ranges of *colour credibility* rather than point-accurate certainties. That's why it's important to work with a properly calibrated and profiled display, and look at whether the image's overall tonality and colour rendition looks about right. Then, before accepting the resulting profile as your standard for this film, check its performance on a number of different images from rolls developed in the same conditions and used in the same scanner.

There is a more manual approach for neutralizing the orange mask. This is the purpose of the **Expansion** tab in the **NegaFix Expert Settings** (Figure 9.23). Very much like the process discussed in relation to Figures 9.21 and 9.22, this process also requires identifying highlight and/or shadow points you believe should be considered as neutral for correctly neutralizing the orange mask.

Before I proceed, a point of full disclosure here: I'm really pleased with the overall quality of these **NegaFix** profiles and the tweaks one can make with the two basic sliders under the film selectors – to an extent that it's unusual to need to resort to the **Expansion** panel for customizing adjustments. So for clearly demonstrating how this **Expansion** panel works, I deliberately selected an incorrect **NegaFix** profile for the film and produced a cyan cast that I'll use the **Expansion** controls to neutralize.

The **Expansion** panel (Figure 9.23) has two sections: in the upper portion, a series of channel-specific histograms with shiftable highlight and shadow controls and in the lower portion, two colour space portrayals – one for the highlights (right) and the other for the shadows (left). The sliders to the right and left of these colour spaces are for controlling brightness. As well, before you adjust anything within the colour spaces there are little black and white buttons for identifying the current hues of the default highlight and shadow colours for the loaded **NegaFix** profile (Figure 9.23, white arrow for the highlight hue).

Working within this panel requires great care, because the adjustments are very sensitive – small tweaks of the controls produce big changes in the colour balance of the photo. Here is the **step-by-step for** making adjustments in this panel.

(a) Find a point you think should be neutral and **Shift>Click** it. This will lay a small circle on it, and just above that circle show a reading of its colour value (in Figure 9.23, Lab of **92L, -8a, -6b**; see the red oval). That reading tells us this is a very bright point with a cyan-bluish cast.

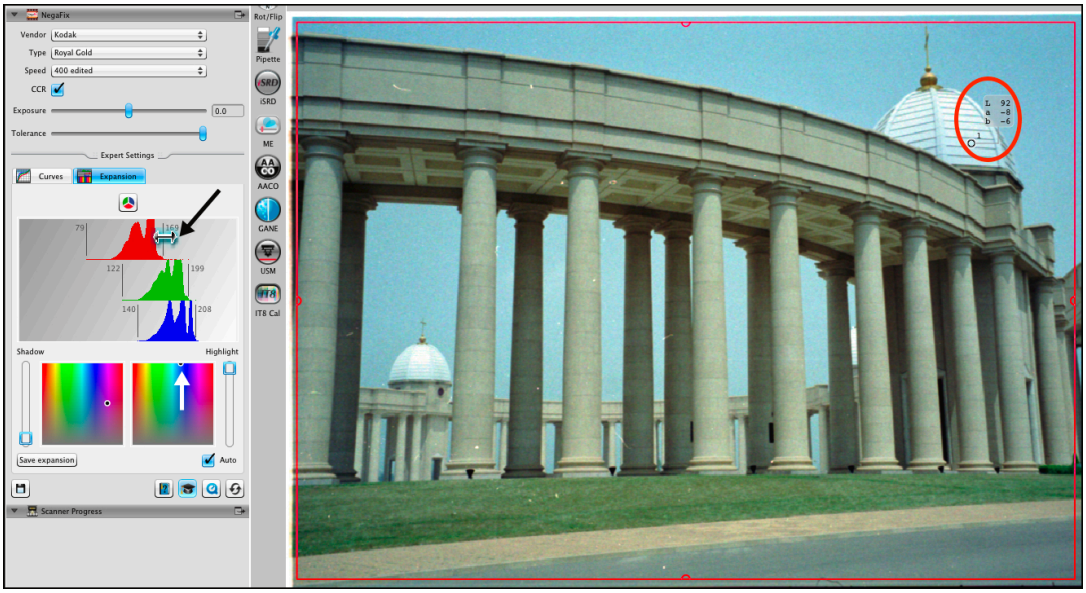


Figure 9.23 NegaFix Expansion – Before Mask Highlight Compensation Adjustment

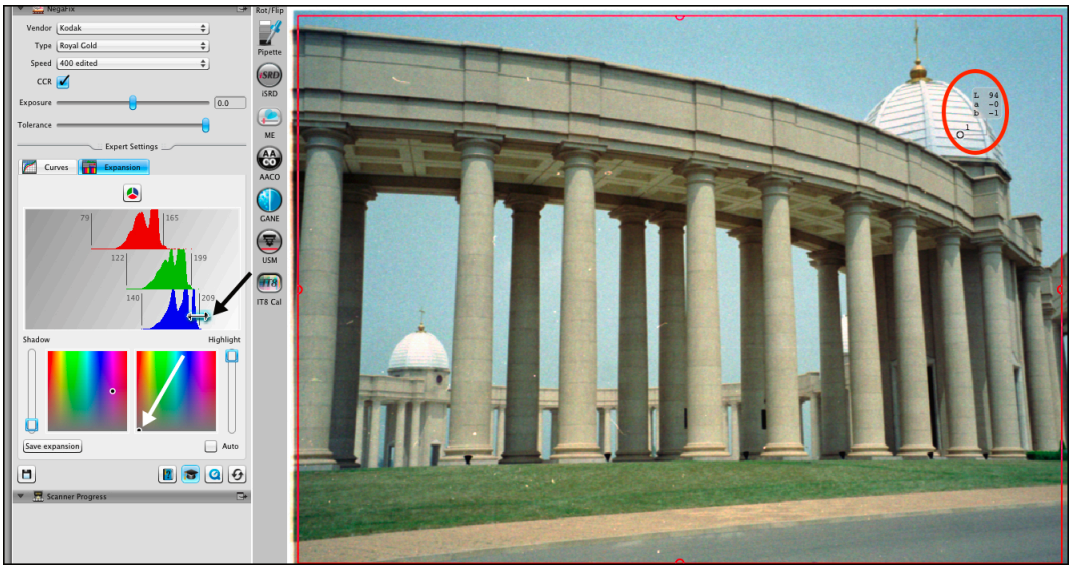


Figure 9.24 NegaFix Expansion – After Mask Highlight Compensation Adjustment

(b) To make it neutral, I need to add some red (which reduces cyan) and subtract a little bit of blue (which adds yellow), until the value of **a** and **b** becomes zero or as close thereto as possible. To do this, click on the vertical bar at the right end of the red histogram (Figure 9.23, black arrow – your cursor turns into a two-way arrow)

and VERY GENTLY drag leftward until **a=0** in that little circled read-out. This brightens red and reduces cyan in the highlights.

(c) Grab the like vertical bar in the blue channel (Figure 9.24, black arrow) and shift it rightward to reduce blue, which increases yellow. The best I could achieve for this spot is **0a** and **-1b** (Figure 9.24), an improvement on the default settings. With this adjustment complete, the black and white dot in the highlight colour space has shifted into neutral territory (the gray bottom of the colour space (Figure 9.24, white arrow).

(d) The same exercise can be repeated for calibrating the shadow end of the orange mask compensation, but the one exercise done to the highlight adjustment above left little to improve upon. Anyhow, I established a shadow point, which shows a shadow cast of **-1a, 2b** (Figure 9.25, red oval) – very slightly yellow. Correcting this really requires only "twitches" at the controls, the mitigation amounts are so small. Moving the left-side control bar of the red and blue histograms ever so slightly produced a totally neutral shadow value of **0a, 0b** (figure 9.26).

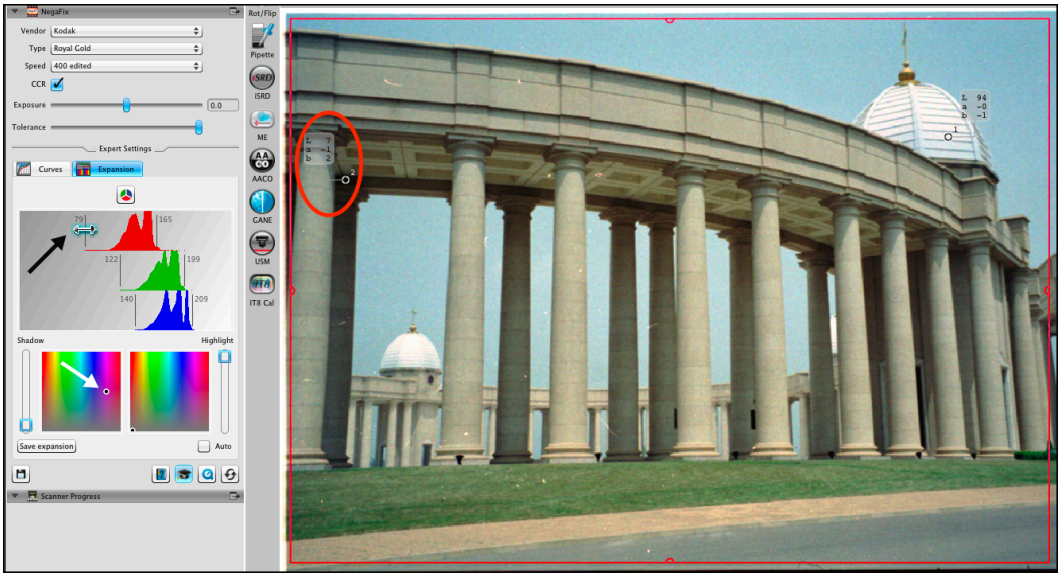


Figure 9.25 NegaFix Expansion - Before Mask Shadow Compensation Adjustment

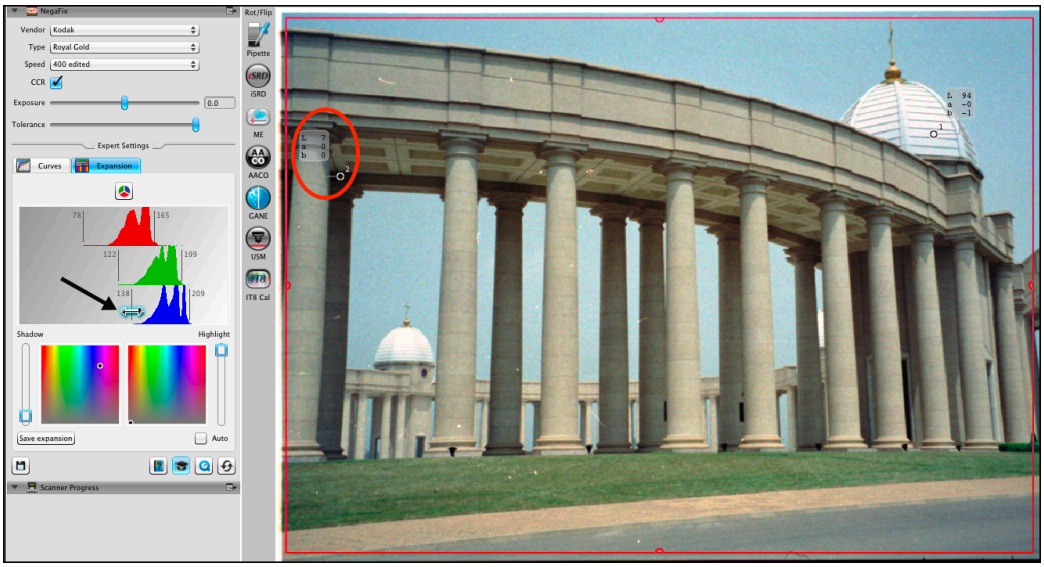


Figure 9.26 NegaFix Expansion - After Mask Shadow Compensation Adjustment

I started at Figure 9.23 and ended at Figure 9.26. You may compare the two and see the improvement to the accuracy of orange mask compensation these four fairly easy adjustments allowed.

Once you have a good set of adjustments, you may save them as a new film preset for all images using the same film stock processed at the same time by the same lab. Do this by clicking on the Save icon, in the lower left corner of the **NegaFix** panel. A pop-up called **Save Settings** appears. Click on it. Another little window called **Save Current** will appear. Enter a name for the new profile in the pane and click OK.

This profile will be available in the list of **NegaFix** profiles next time you use the tool. You do not need to concern yourself about anything beyond step (1) for converting a negative using **NegaFix** for all film having the same characteristics.

When you are finished in the **Expansion** panel, you may remove the orange mask compensation points you set by doing a **Shift>Click** on each of them.

Once the correct **NegaFix** profile is applied and a few tweaks (to taste) made with the colour and tone controls in SF8, the resulting positive image opened in Photoshop compares well with any of the non-**NegaFix** alternatives I explored above, and it is much simpler and faster, given that most of the time you may not need to do more than step (1) (Figure 9.27).

Figure 9.27 With versus Without NegaFix to Photoshop

Finally, questions arise about colour management at the scan stage for scanning colour negatives. The good news is that it doesn't matter, and the bad news is that it does. It doesn't matter in the sense that from the moment you select **Negative** as the scan type, no matter what colour management you think you are doing by selecting various **Input** profiles in **Preferences>CMS**, it's effect is just about nil (Figure 9.28). Recall in Chapter Three how the choice of the Nikon LS-2000 profile severely wrecked the colour rendition of a positive transparency scan using the Nikon 5000.

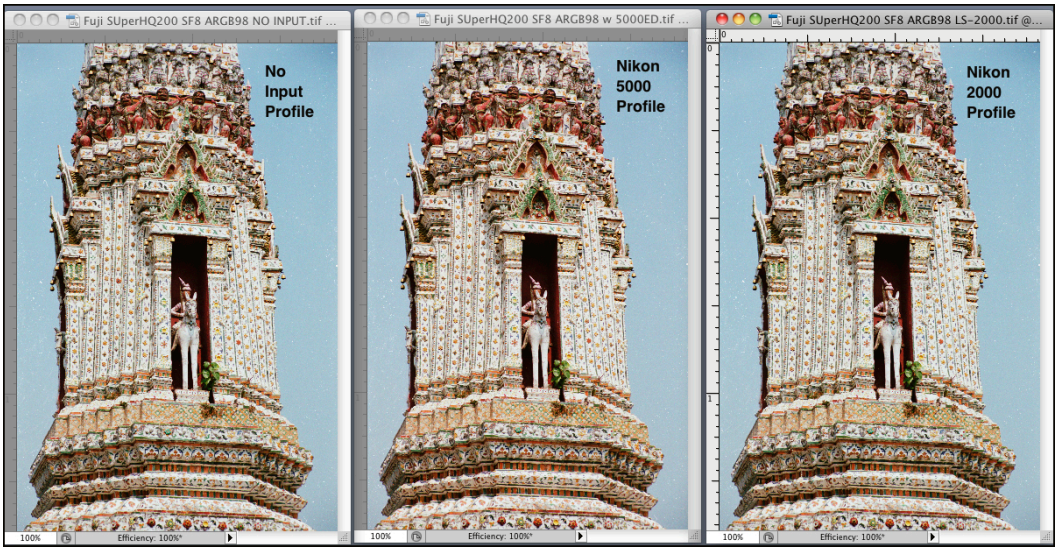


Figure 9.28 Input Profiling of Colour Negative Scans

However, the choice of colour space (**Internal** profile) does matter, and you should make a conscious choice of whether to use sRGB, Adobe RGB(98) or ProPhoto RGB as I discussed in Chapter Three.

Chapter Ten
Integral Workflow Strategies

One of the more interesting characteristics of digital imaging is that, more often than not, there are viable alternatives for achieving similar outcomes. As well, there is no one piece of software that is necessarily "the best" at everything it does. Different applications having similar functions can produce different results from "the same" tool, leaving the final choice to user preference.

Therefore, I consider it normal in a book on SilverFast – and indeed advantageous to you the user – presenting workflows that combine this application with others, to varying extent, depending on the chosen approach. I present several variants here – there are undoubtedly others, so these should be considered as generic examples (Figure 10.1).

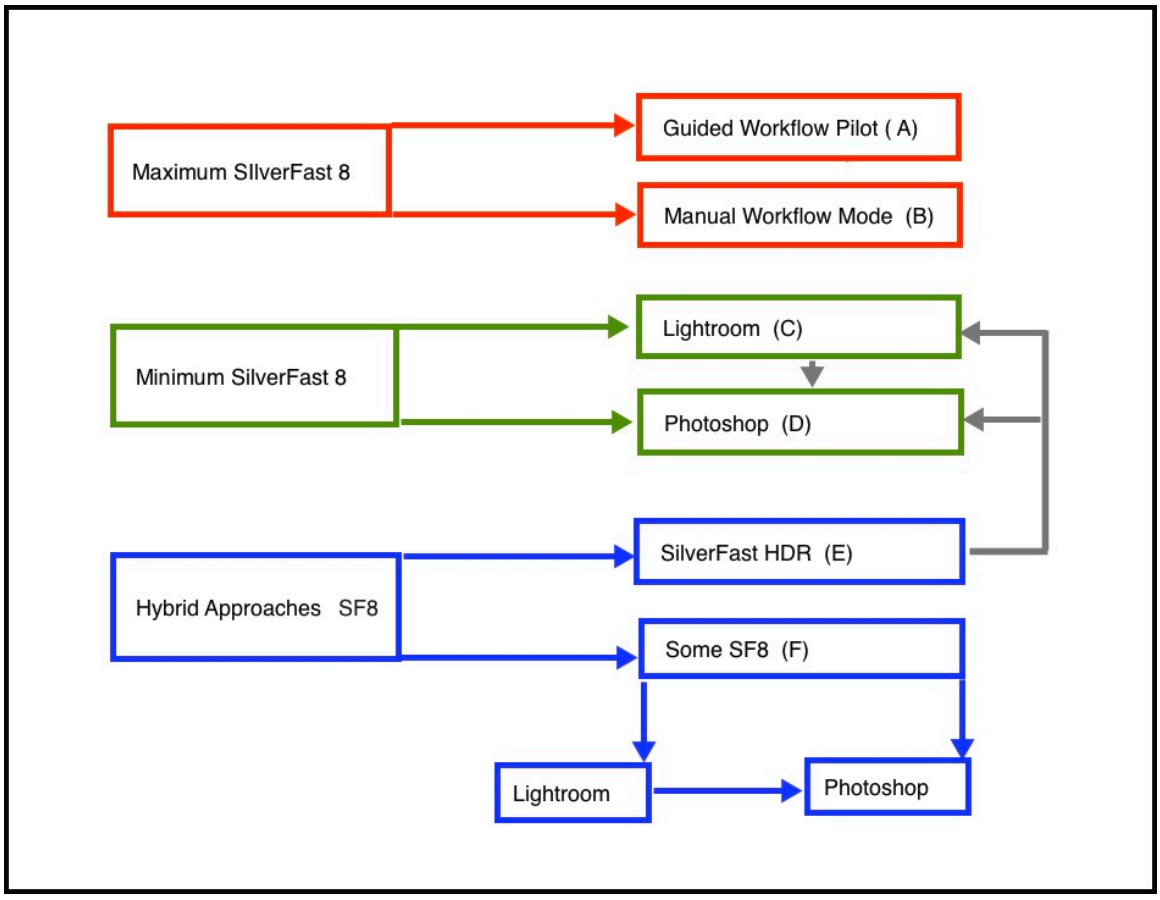


Figure 10.1 Workflow Approaches

I encourage you to experiment and develop others according to your taste and needs. For all of these variants, however, I remind you to review Chapter Two for those things that really are specific to the scanner and should be implemented at the scan stage. I also provided basic set-ups in Chapter Two, and for convenience I provide some of that material here as well.

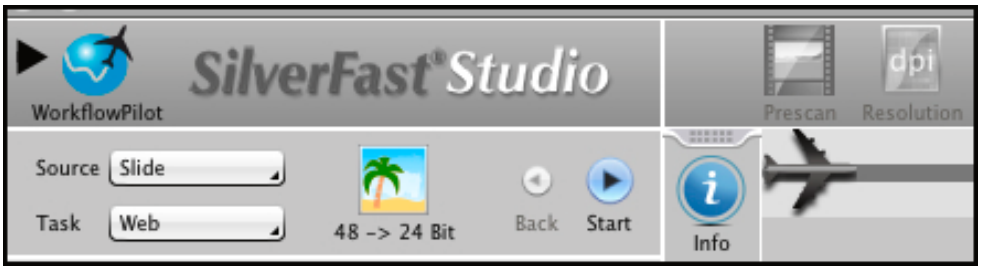
I spend a few moments explaining Figure 10.1 and then present the **step-by-step** for implementing them.

There are three main strategy groups identified in red, green and blue: **Maximum SF8, Minimum SF8,** and **Hybrid Approaches**. Within each group, there are several variants, labeled from (**A**) to (**F**). I provide a brief description of the variants, and then discuss their implementation.

As I've already presented alternative workflow strategies making more or less use of SF8 and SilverFast HDR in the previous chapter on "Conversions" (B&W and negatives), in this chapter the discussion focuses on colour transparencies, except in Variant A. Please apply Chapters One, Two and Three before using these variants.

Variant (A) WorkflowPilot

Readers in a hurry to just make scans will really appreciate the SF8 **WorkflowPilot**, represented by the cyan globe in the upper left corner of the application interface. If your interface happens to be on Red, but you want the guided approach, just click the globe, it will turn cyan and the Guided Workflow will be presented (Figure 10.2).



10.2 Guided Workflow Pilot Selection

It is useful before implementing this strategy to enter **Preferences>Workflow Pilot** and make sure that all the tools you want to work with are selected. These are explained in Chapter Three. Thereafter, using this approach is simply a matter of clicking **Start**, waiting for the prescan, and thenceforth, once you click **Continue,** the airplane lands at the next station, you make the adjustments you need, and keep progressing through the icons that way, ending the procedure with clicking the **Scan** icon. Several adjustments available in the Manual Mode are not available here; if you need them, you may revert to Manual Mode by clicking on the cyan globe.

Variant (B) Manual Mode

In this variant, you use SF8 for doing as much of the image editing it allows, in the order and to a depth of your choosing. Most of what I covered in previous chapters fit both the Manual and **WorkflowPilot** Modes.

Variant (C) Minimum SF8 Followed by Lightroom

In this variant, save for the essential steps needed for scanning in the scanning application (Chapter Two), you do just about nothing in SF8 and use the automated procedure laid out in Chapter Two for funneling the scan straight into Lightroom, where you do all you can or want there, and then perhaps send it on to Photoshop as needed.

Variant (D) Minimum SF8 Followed by Photoshop

This variant is very similar to (C), but you by-pass Lightroom and proceed directly from SF8 to Photoshop, where you do most of the image editing.

Variant (E) Hybrid Using SilverFast HDR

This is akin to a Minimum SF8 strategy, because if you scan in SilverFast HDR mode, most of the editing options in SF8 are disabled. You will be editing in the HDR application. The advantage of this workflow is that you can revert to the unaltered scan at any time and redo the adjustments you made in SilverFast HDR without rescanning, then resaving the file with another name for onward processing. It is an archiving and re-editing solution within the SilverFast family. Having made the HDR scan, you can choose how much processing you wish to do in HDR, versus how much in Lightroom and/or Photoshop. Sending a scan from SilverFast HDR to Lightroom uses the same procedure as in variant (C), detailed in Chapter Two.

Variant (F) Some Editing in SF8 and some in Lightroom and/or Photoshop

In this hybrid, you don't seek to either maximize or minimize the use of SF8, you do by-pass SilverFast HDR, and you make varying usage of Lightroom and/or Photoshop. The main hybrid of interest here is opting for specialized noise reduction and sharpening functions in Lightroom and Photoshop. As well, Lightroom has particular strength in Luminosity editing and B&W conversions.

In all of these variants, because neither SF8 nor SilverFast HDR can make slide shows, web galleries or prints, sooner or later the image will end-up in applications such as Lightroom and/or Photoshop at least for these purposes.

As I've already explored the "whys" and "how-to" of the application's tools in the previous chapters, this chapter is a straightforward step-by-step "what do I do next" series of presentations covering each of the six variants in turn.

(A) The WorkflowPilot

The **WorkflowPilot** is a major piece of software design intended to simplify the whole scanning process as much as possible (along with some options for customizing its workflow), while delivering high quality results. The manner in

which it does this is to guide you through the image preparation and scanning process in a series of logically ordered steps. The steps vary depending on the source material you are scanning (e.g. positive, negative) and the kind of scanning task you are undertaking (e.g. web, print). It is intended for single images, not batch scanning. For every combination of **Source** and **Task**, LaserSoft Imaging has "pre-packaged" what in their view is the necessary set of image adjustments you should consider implementing, and they have looked after colour management under the hood as well. If you wish to simply remain with the "factory defaults" for these workflows, you should skip steps 4,5,6,7 and 8 in the step-by-step below. In this case you would implement steps 1,2,3 and 9 onward.

However, you aren't confined to those recipes. As I laid-out in some detail in Chapter Three on **Preferences**, you can tailor each **Source-Task set** to include the options that are feasible and you want, and for your convenience I revisit some of this material in steps 4,5,6,7 and 8 below.

SilverFast also makes you life easy in the guided **WorkflowPilot** by providing handy context guidance (the text against blue background of the kind in the upper left corner of Figure 10A.8).

In the first 3 or 8 steps below, I am setting things up to use the **WorkflowPilot** in the manner wanted, and from step 9 onward I am implementing the **Task** based on the **Source**.

WorkflowPilot Step-by-step:

1. Turn on your scanner. You must do this first, otherwise SF8 will not recognize the existence of your scanner.

2. Open SF8. The welcome screen appears (Figure 10A.1). If you have more than one scanner, select the correct scanner and click on **Start** (Black arrow).

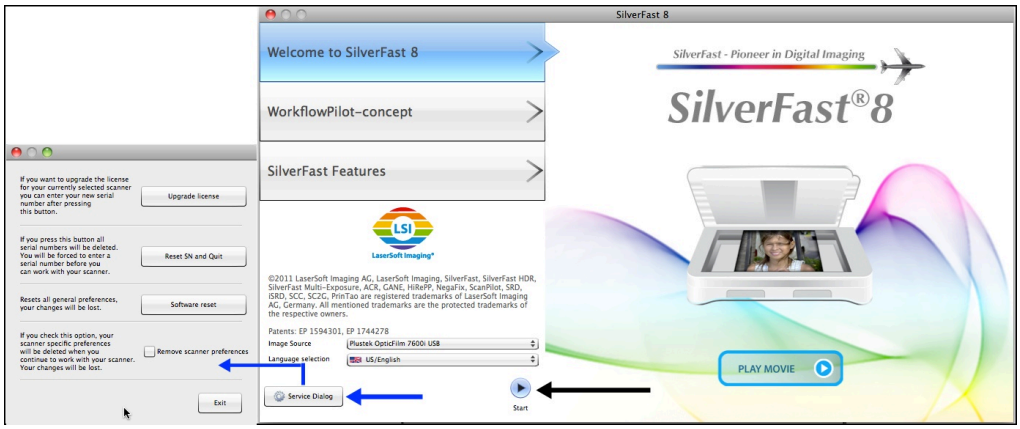


Figure 10A.1 Welcome Screen

Before proceeding further into the **WorkflowPilot**, you have two choices about dealing with application **Preferences**: (a) ignore them completely and use the SF8 defaults or, (b), customize the **WorkflowPilot** tool to your taste. To use SF8 defaults, skip down to **Step 7** now. To customize **WorkflowPilot Preferences**, you must be in Manual mode (red globe in the upper left corner of the interface). If you happen to be in **WorkflowPilot** mode (Figure 10.A2, cyan globe in the upper left corner), click on it. It will turn red, meaning you are now in Manual mode. Then follow Steps 3 onward. For purposes of demonstrating all the steps possible in the **WorkflowPilot**, I have activated all filters in **Preferences** except **Automatic**, as I prefer to show you the adjustments from the unadjusted status of the image.

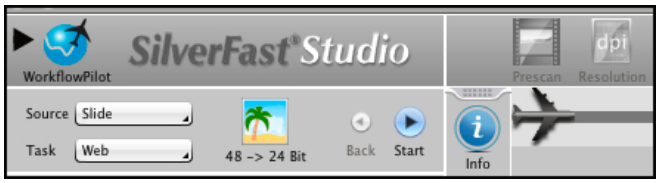
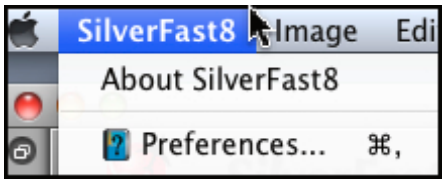


Figure 10A.2 Guided Workflow Pilot Mode Selected



10A.2a Preferences Command

3. Open SilverFast Preferences (**SilverFast>Preferences**, Figure 10A.2a), and click on the **WorkflowPilot** icon (Figure 10A.3, red arrow).

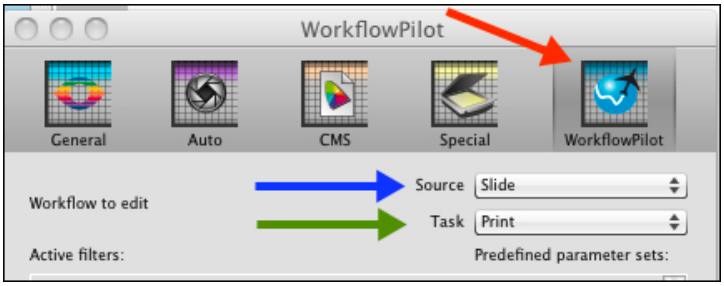


Figure 10A.3 Workflow Pilot Preferences Set-up

4. In the top right of the interface, click on the drop-down panes for the **Source** and the **Task** (Figure 10A.3, blue and green arrows respectively). The **Source** drop-down menu provides three types of media for film scanners (Slide, Kodachrome and Negative), and adds two more for flatbed scanners (Print and Photo). The **Task** drop-down provides for Archive, Web, Print, Presentation and Edit functions for film scanners, and the same for flatbed scanners, except that the term **Archive** is replaced with **Raw Scan** (Figure 10A.4)**.** They mean the same thing. You may select any **Task** and any **Source** by clicking on them. SilverFast has preset selections of the tools (**Active Filters**) that will be made available for each pair of **Source** and **Task**, and these will suffice for many users. However, for demo purposes here, I am purposely selecting a comprehensive set of tools. You the user can customize these choices to suit your needs, as explained below.

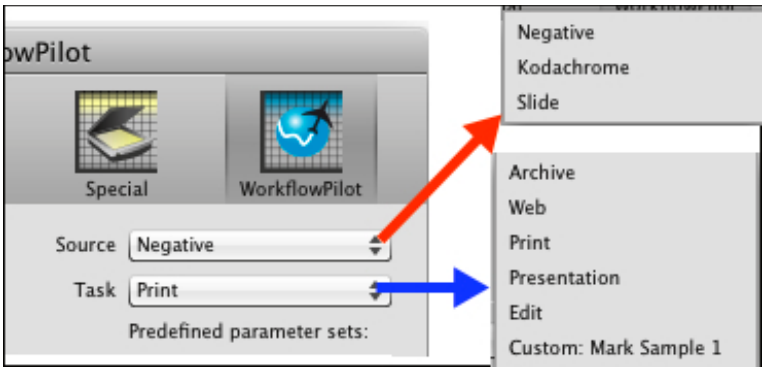


Figure 10A.4 Source and Task Options

5. For each Source-Task pair, SF8 activates a number of menu items (called **Active Filters**, Figure 10A.5, red arrow). For example, if you were to select (by clicking on them) **Slide** and **Raw Scan**, all the filters would be turned off, except for **ME** (Multi-Exposure). If you were to select **Negative** and **Print** many functions would be turned on. You may select or deselect these filters as you see fit by clicking in the checkbox to the left of the name of the filter (Figure 10A.5, blue arrow). To turn a filter on, click the checkmark on in the box and the box turns blue. You know it is selected. To remove it, click in the checkbox again to remove the checkmark. The ones that are selected will appear in the top-most icon bar of the application interface, and these are the items at which the **WorkflowPilot** will stop for you to make whatever adjustments you require. This is why it is important that you make these preference choices before you start the scanning process.

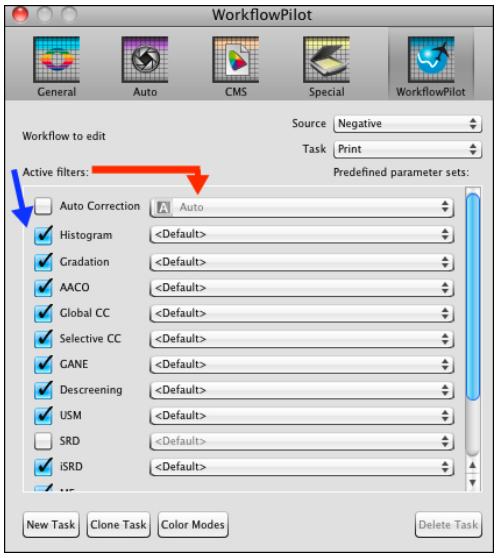


Figure 10A.5 Active Filters

In the **WorkflowPilot Preference** panel at the bottom, third button from the left (Figures 10A.5, or 10A.5a, red arrow) there is the **Color Mode** selector button. This is for determining which of the scanning colour modes will

appear in the **Scan Type** dialog, third icon at the head of the **Dock** (an illustration of which I've pasted onto the extreme right side of Figure 10A.5a below). Click on the **Color Modes** button and the dropdown menu **Select Color Modes** will open (Figure 10A.5a, center portion, blue arrow). CMD (Mac) CTRL (Windows) click each of the options you wish to see represented in the **Scan Type** dialog, making sure the ones you want stay highlighted in blue, then click **OK**. To know more about the meaning of these choices, please revert to Chapters Three and Five.

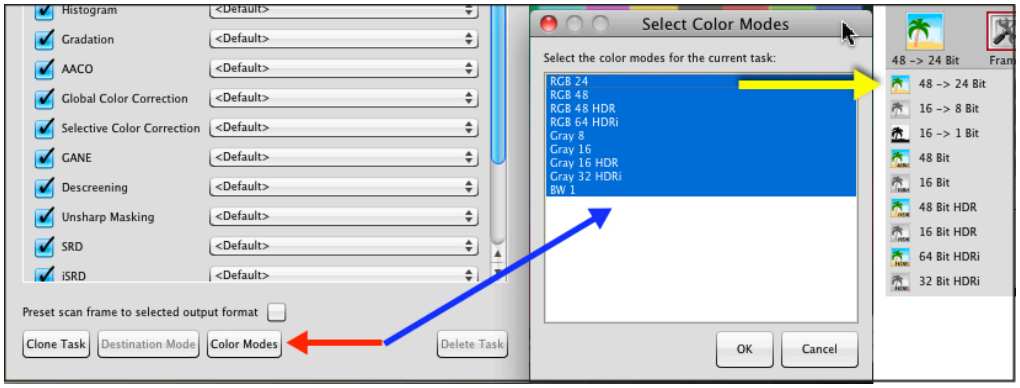


Figure 10A.5a Color Modes in Guided Workflow Pilot

6. You may save a group of preferences under the name of a new task by clicking on the **New Task** button at the bottom left of the menu (Figure 10A.6 red arrow). A window will open asking you to name the task (Figure 10A.6, blue arrow). Give it a name and click OK, then select all the filters you wish to associate with this task. This new task will be stored in the **Task** list along with all your selected filters, to be called up by default when you select this task.

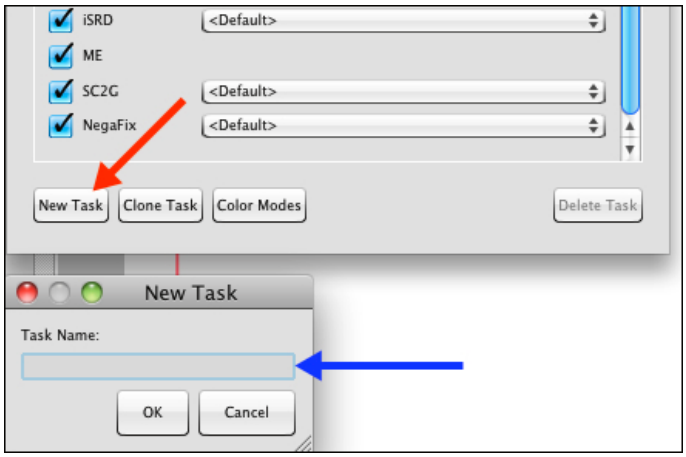


Figure 10A.6 New Task Specification

7. Having finished with Preferences, make sure that you have selected the **WorkflowPilot**, by toggling the globe/airplane in the upper left corner of the interface till you see the Cyan globe (Figure 10A.2). You will find it very

handy to be guided by the context help for each step, found in the upper-most part of the dock – text with blue background.

8. In the demonstration that follows, I'm scanning a negative for print, and I've selected almost all the filters. I left **Auto Correction** off[31], as well as **SRD** off, because I have **iSRD** on (detailed use explained in Chapter Six).

9. Before you click the **Start** button (Figure 10A.7 red arrow), select the **Source, Task**, and **Color Mode** (Figure 10A.7 blue arrow) in the top bar of the dock. From the time you click the **Start** button, these options are grayed-out and inaccessible, so please don't forget to do them now. (If you do forget, you can click on the **Back** button (left of the **Start** button) to return to the beginning and select them, but then you will need to repeat most of the steps you've completed in the meanwhile.)

Figure 10A.7 Launch the Workflow Process

10. Insert the negative into the scanner and click the **Start** button (Figure 10A.7, red arrow). SF8 will launch a Prescan of the selected image frame (in my demo, working with the Plustek 7600i scanner).

11. In the **Scan Dimensions** panel (Figure 10A.8, in the Dock under the blue **Workflow Pilot Assistant**), click on the **Format** drop-down (Figure 10A.8, blue arrow), then click on the applicable output format in the drop-down menu (e.g. an A4 size print as indicated in this illustration). To the right of the **Format drop-down**, click on the left icon for portrait orientation and the right icon for landscape orientation. Then click on the **Preset** pane, (just under the **Format** pane); in the dropdown menu, click on either 300 PPI for photo quality or 150 PPI for draft quality. If you see that the red scan frame is incorrectly positioned relative to the image dimensions (Figure 10A.8, green arrow) or that image has the wrong orientation, click on the Rotate/Flip button (Figure 10A.8, red arrow) and click on the direction of rotation and/or flip needed to show the image correctly. Uncheck the box in the **Scan Dimensions** panel that says **Fix Scan Frame to Selected Output Format**

[31] The use of Auto Correction is a workflow preference that varies from person to person. To some it provides a quick-starting point, which may or may not require subsequent tidy-ups, while others may prefer to make their adjustments from the beginning, without this initial set of automatic corrections. I am of the latter persuasion.

(Figure 10A.8, orange arrow)**.** Then use your cursor to drag the frame to outline the portion of the image you wish to include in the scan. This crops the image to the area you want in the scan.

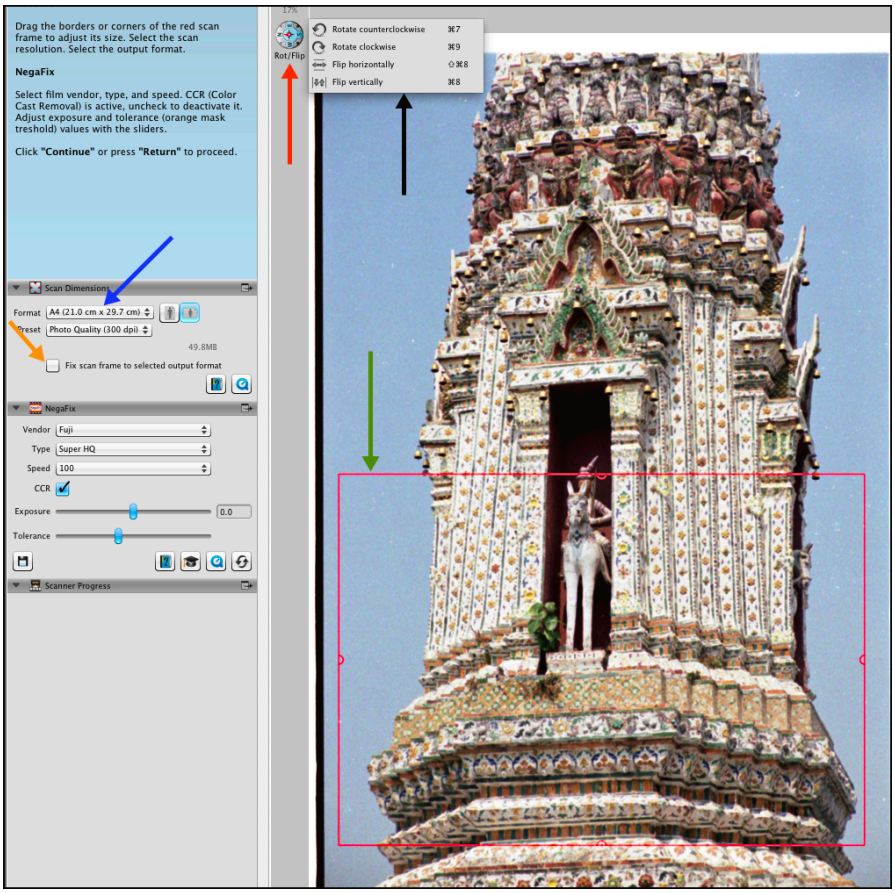

Drag the borders or corners of the red scan frame to adjust its size. Select the scan resolution. Select the output format.
NegaFix
Select film vendor, type, and speed. CCR (Color Cast Removal) is active, uncheck to deactivate it. Adjust exposure and tolerance (orange mask treshold) values with the sliders.
Click "Continue" or press "Return" to proceed.
Scan Dimensions
Format A4 (21.0 cm x 29.7 cm)
Preset Photo Quality (300 dpi)
49.8MB
Fix scan frame to selected output format
NegaFix
Vendor Fuji
Type Super HQ
Speed 100
CCR
Exposure 0.0
Tolerance
Scanner Progress
Rot/Flip
Rotate counterclockwise ⌘7
Rotate clockwise ⌘9
Flip horizontally ⇧⌘8
Flip vertically ⌘8

Figure 10A.8 Scan Frame and Orientation

12. If you need other settings for image output format or output PPI, you will have to switch to the manual mode (red globe, see section 10B below) and use the additional settings available in the **Scan Dimension** panel.

13. Because this demo is using a colour negative, in the **NegaFix** panel (Figure 10A.8, under the **Scan Dimensions** panel) select the colour negative film you are scanning by clicking on each of the three panes in sequence (**Vendor, Type, Speed**) and clicking on the appropriate selection for that pane (e.g. in the illustration I have selected Fuji Super HQ, Speed 100. Leave the **CCR** (Colour Cast Removal) box checked by default. If the negative preset does not perform an adequate conversion, you may adjust the settings using the **Exposur**e and **Tolerance** sliders underneath these panes (by clicking and dragging). The **Exposure** slider affects brightness, and the **Tolerance** slider adjusts orange mask detection. If that is insufficient, click on the grad-cap icon in the lower right of the panel and make further refinements using the

Curves and **Expansion** features within the **NegaFix** tool. Please see Chapter Nine for details on using these controls.

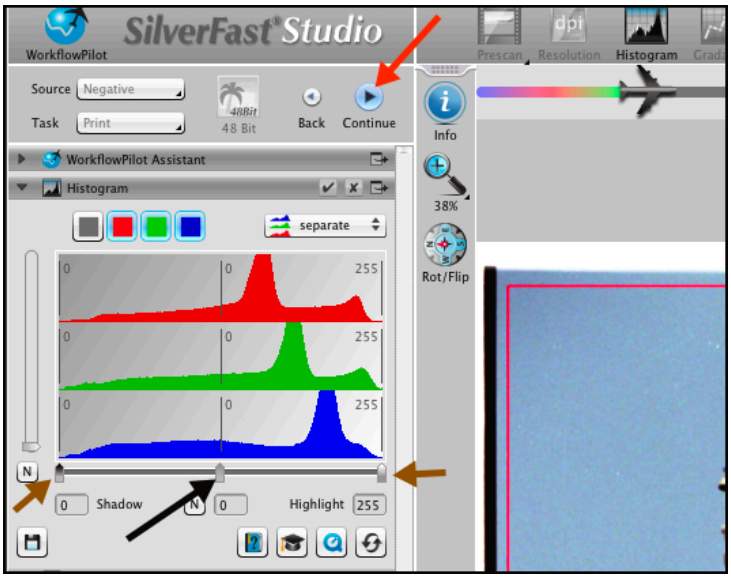


Figure 10A.9 Histogram Panel

14. With all of the above done, click on **Continue** (Figure 10A.9, red arrow). The airplane will land under the **Histogram** icon and the **Histogram** panel will open in the Dock. The main purpose of the Histogram is to control image tonality (brightness and contrast). All the tones in the image are arrayed along the horizontal axis from 0 (black) on the left to white (255) on the right. The higher the graph (vertically) the higher the frequency of the tones represented there. For example, Figure 10A.9 shows that the major concentration of blue tones is on a lighter part of the tonal range than that of red, while green is in-between. In SF8 Ai Studio, you may view the histogram in one of three modes (**separate, transparent** or **additive**). I prefer the separate view shown in Figure 10A.9 (available in **Ai Studio**), to see clearly the tonal distribution for each colour channel.

15. For the image in Figure 10A.9, the shape of the histogram is good – the tonal range is well distributed from black to white with no clipping, and the mid-tone brightness is OK. Evidence of tonal clipping is apparent when the end-points of histogram are abruptly cut-off such as shown in the figure immediately below, or if tones are climbing one or both of the end-walls.

Figure 10A.9a shows an image that needs tonal adjustment, and I'll show how it's done in this panel.

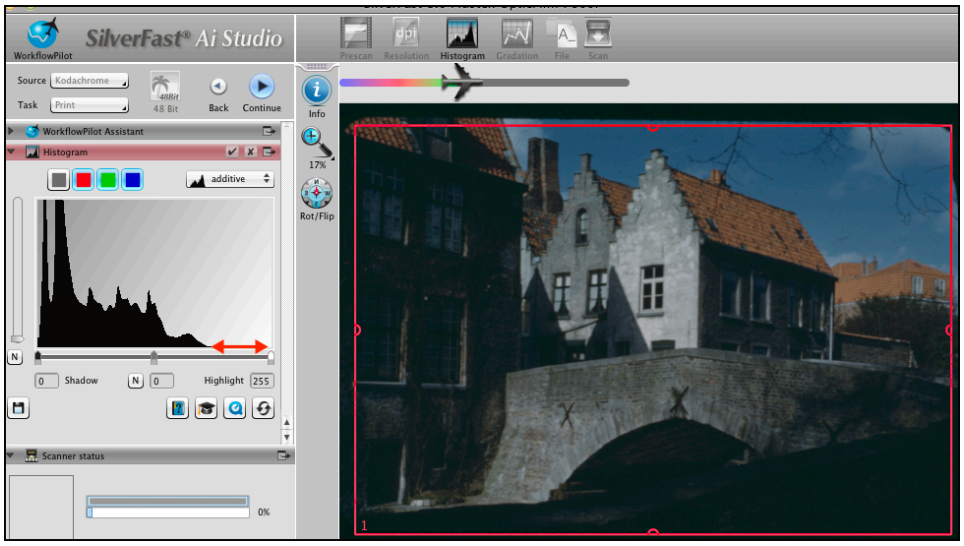


Figure 10A.9a Image Needs Brightening

One of the reasons why the image is too dark is because the brightest tone of the photo sits quite far down the scale in the grays, as you can see by how far the right tail of the histogram is from the right (highlight) side of the graph (Figure 10A.9a, red arrows). I correct that by remapping brightest areas of the image to the brighter end of the tonal scale by moving the right slider under the graph toward the right tail of the histogram (Figure 10A.9b, red arrows).

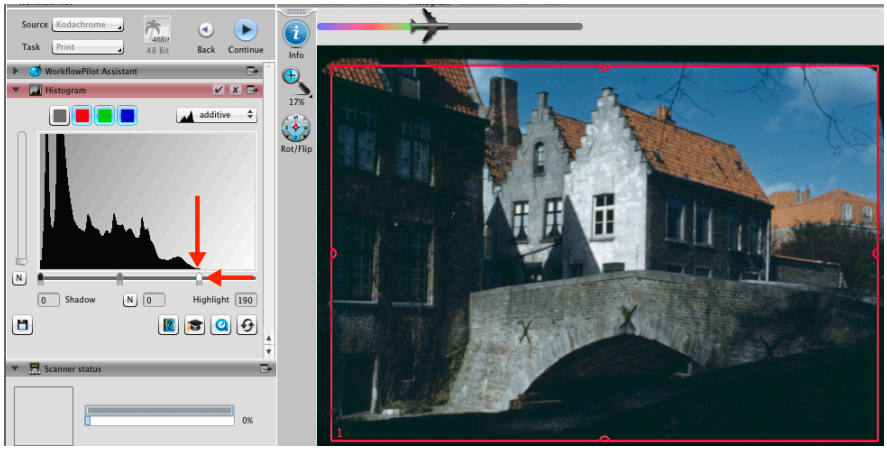


Figure 10A.9b Highlights Brightened

I think it could use yet more brightening, this time of the mid-tones. I do this by click/dragging the middle slider (figure 10A.9c, red arrows) rightward toward the bright end of the scale.

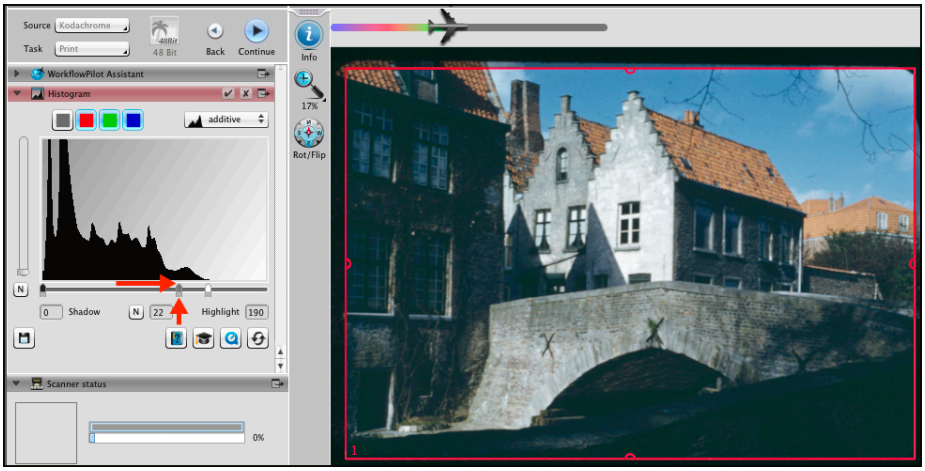
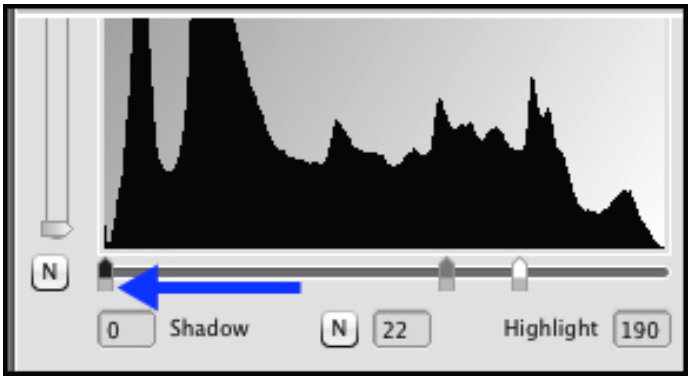


Figure 10A.9c Midtones Brightened

By pressing the ALT key on our keyboard, we see the effect on the histogram of the edits I just made, as shown just below; the tone "map" looks much healthier – bright tones in the highlights (right side) and the darkest tones (left side) show very little clipping.



10A.9d Output Histogram

The slider at the left-end of the graph Figure 10A.9d, blue arrow) is for adjusting the dark tones. Shifting this slider rightward darkens them more, which would be unwanted in this image.

General rules for adjusting tone with the Histogram tool:

- Shifting the right slider left brightens highlights and increases contrast.
- Shifting the left slider right darkens shadows and increases contrast.
- Shifting the middle slider right brightens, and left darkens mid-tones.

In the Expert Settings of this panel (**Ai Studio**), you may find the **Color Cast Removal** slider useful for correcting a colour cast. More information about image luminance is in Chapter Seven, and colour correction in Chapter Eight.

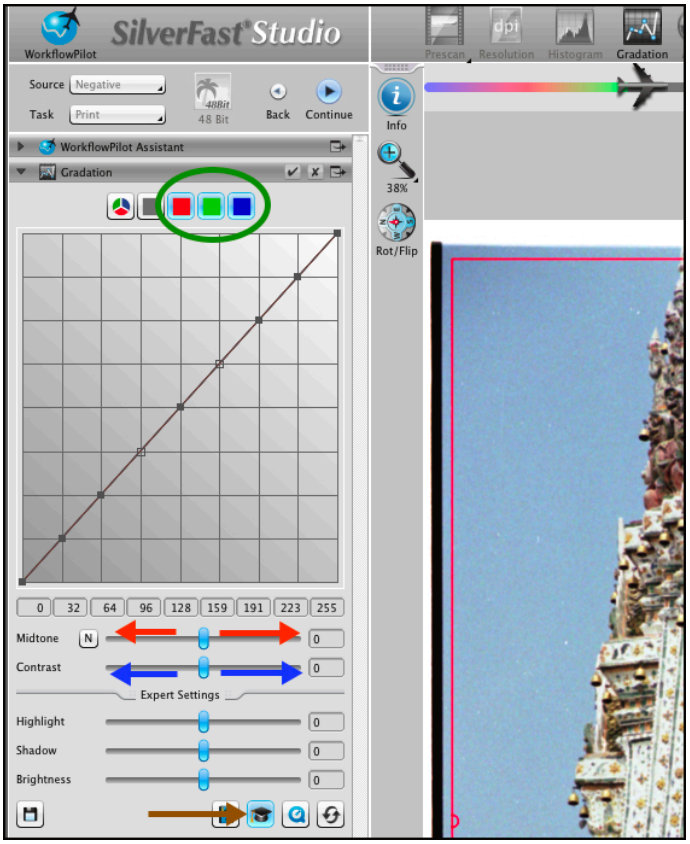


Figure 10A.10 Gradation Curve Adjustments

16. Once finished with the **Histogram** panel, click **Continue**. The airplane will land under the **Gradation** icon and the **Gradation** Curve panel will open in the Dock (Figure 10A.10). This is SF8's tone curve, allowing you to make localized edits of brightness and contrast. Shifting the **Midtone** slider (Figure 10A.10, red arrows), by clicking and dragging its blue control button to the left or right will darken or brighten the midtones respectively. Shifting the **Contrast** slider (Figure 10A.10, blue arrows) by clicking and dragging its blue control button to the left or right will reduce or strengthen image contrast respectively. If you need more control over the luminance of highlights, midtones or shadows, you may click on the grad-cap (Figure 10A.10, brown arrow) to open the **Expert Settings**, where there are separate sliders for influencing the tonality of these zones individually. In order to prevent banding, when using the sliders for highlights and shadows, there is some spill-over of impact into the midtones, so it is necessary to pay attention to the effect that moving these sliders has on the image midtones. More information about adjusting luminosity using the **Gradation** Curve appears in Chapter Seven. You may also alter the image colour balance by shifting the individual channel curves, selected by clicking on their individual icons (Figure 10A.10, green oval). I don't recommend you do this until you

read how to use them (Chapter 8), and for further understanding of the colour relationships involved – Appendix 1.

I summarize this section on use of the **Gradation** curve by giving you three "cardinal rules" governing its use:

- Steepening any portion of the curve increases image contrast along that range, while flattening it reduces contrast.
- Transitions between steepening and flattening matter. If the transitions between steepening and flattening are too abrupt, strange and unwanted impacts on the image can occur, the remedy being to smoothen the transition between the contrast ranges by adjusting the curve points (up or down or left or right) so that the slopes between steeper and flatter ranges are more similar.
- Shifting a curve point leftward or upward increases brightness, while shifting it rightward or downward reduces brightness.

17. Once finished with the **Gradation** panel, click **Continue**. The airplane will land at the **AACO** icon, and the **AACO** panel will open in the Dock (Figure 10A.11). AACO means **Auto-adaptive Contrast Optimization**. The purpose of this tool is to open-up shadows. Click and drag the **Shadow Width** slider (Figure 10A.11 red arrow) rightward to increase the tonal range (from shadows to mid-tones) over which the **Strength** slider (Figure 10A.11, blue arrow) will brighten shadow areas. Click and drag the **Strength** slider rightward to brighten shadows. In the **Expert Settings**, you may increase saturation of the dark tones by clicking and dragging the **Saturation** slider rightward. As the **Radius Level** slider is increased from level 1 through level 4, the darkest shadow areas become less brightened than the lighter ones, often beneficially increasing contrast (tonal differentiation) within the darker areas of the image. Chapter Seven (Fig. 7.21, **AACO**) shows its effects.

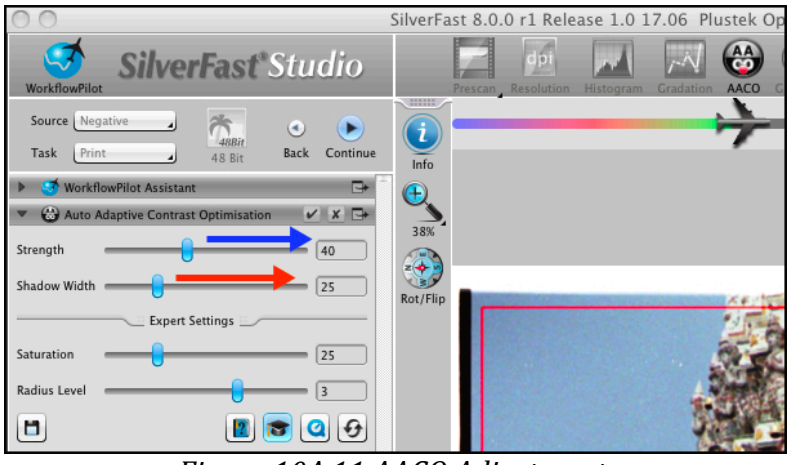


Figure 10A.11 AACO Adjustment

18. You may also use this panel to darken shadow areas by moving the basic sliders leftward from their default settings, but this would probably be used rarely. I recommend only very conservative adjustments if using this tool.

19. Once finished with **AACO**, click **Continue**. The airplane will land under the **Global Color Correction (GCC)** icon and the **GCC** panel will open in the Dock (Figure 10A.12).

20. In its default position, the full tonal range of the image is selected, as you can see from the blue squares highlighting the three tonal zones (**25, 50, 75** for light tones. mid-tones and dark-tones respectively) above the colour wheel (Figure 10A.12, green oval). If the whole image has a colour cast, click on the colour you wish to move **toward**, which is opposite the colour cast you wish to migrate from. (Appendix 1 and the Colour Balancing Primer below explain these colour relationships.)

21. Hence, for neutralizing a cyan, blue or magenta cast, you would click repeatedly on the red, yellow or green buttons respectively (Figure 10A.12, blue arrows) to remove it. You can navigate between the axes of these colour opposites by clicking on more than one colour button sequentially. For example, to move toward a tone between magenta and red, first click say on red a number of times, then on magenta till you achieve the point that neutralizes the cast.

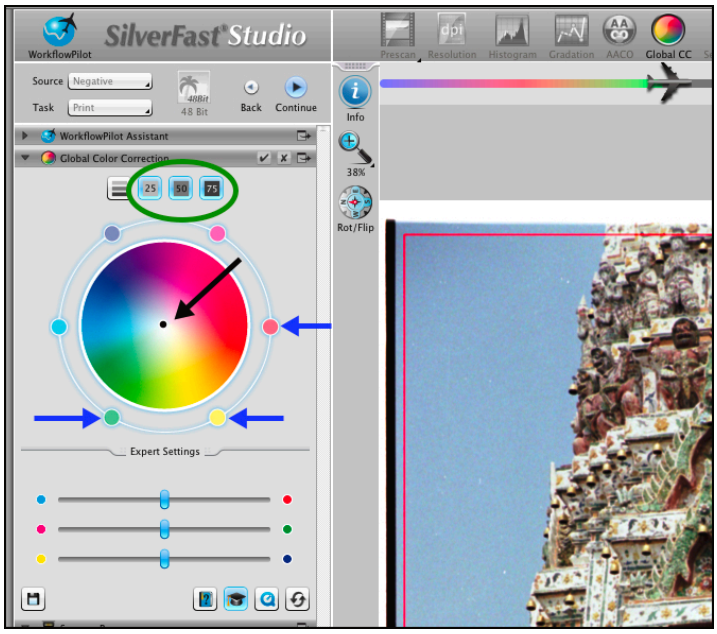


Figure 10A.12 Global Color Correction

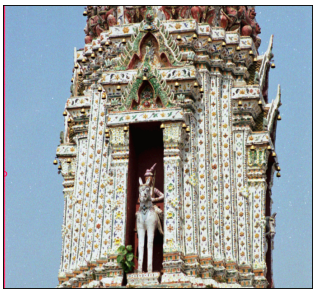
22. There are other ways of moving around in the colour wheel. You may grab the black dot (Figure 10A.12, black arrow) with your cursor and move it to any spot within the wheel. Moving it around the wheel changes hue, while

the closer you move it toward the outer edge of the colour wheel, the more saturated the colour into which you are migrating. Alternatively, in the **Expert Settings**, you may click and drag on the three sliders that affect the colour balance of the opponent pairs cyan-red, green-magenta and blue-yellow. Please consult the inset next page: **Colour Balancing - Quick Primer**.

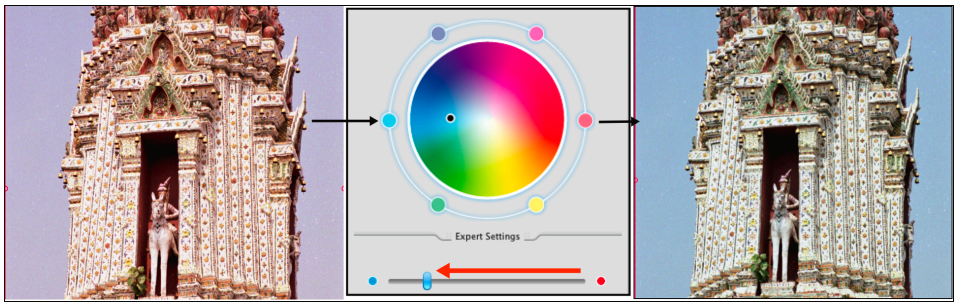
23. At the top of the colour wheel, by selecting the **25, 50** or **75** buttons (Figure 10A.12, green oval), you can affect the colour balance individually of the highlight, midtone or shadow areas respectively, one zone at a time.

INSET: Colour Balancing - Quick Primer

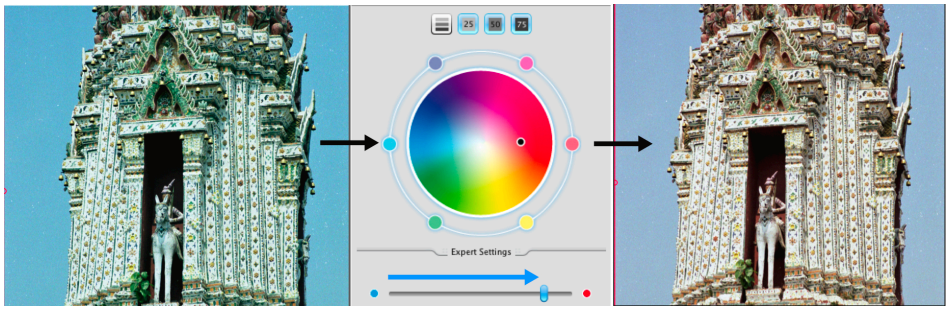
(0) Here's how the image should look when correct:



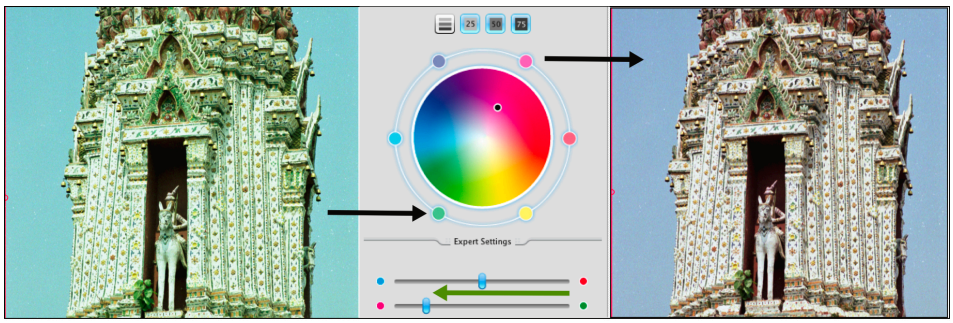
(1) To eliminate a **red** cast, add cyan (this neutralizes red):



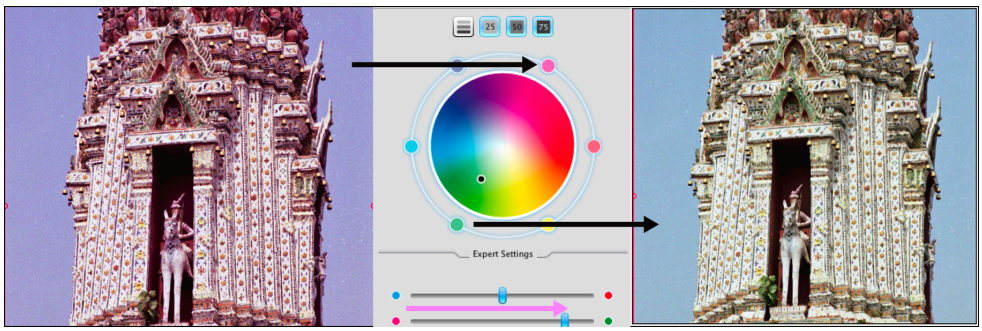
(2) To eliminate a **cyan** cast, add red (this neutralizes cyan):



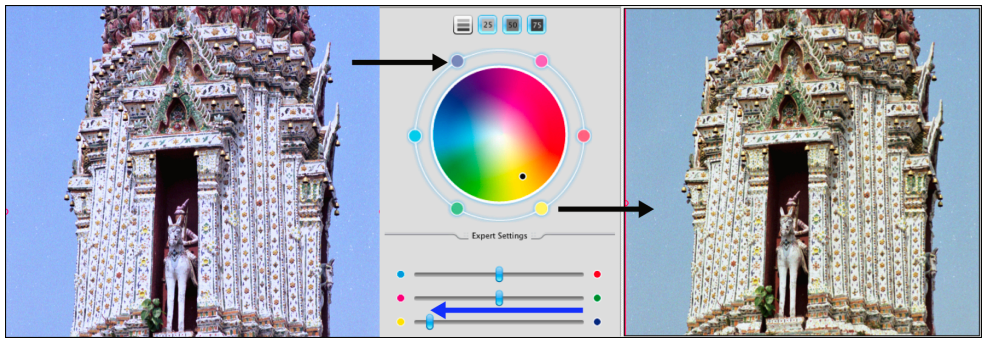
(3) To eliminate a **green** cast, add magenta (this neutralizes green):



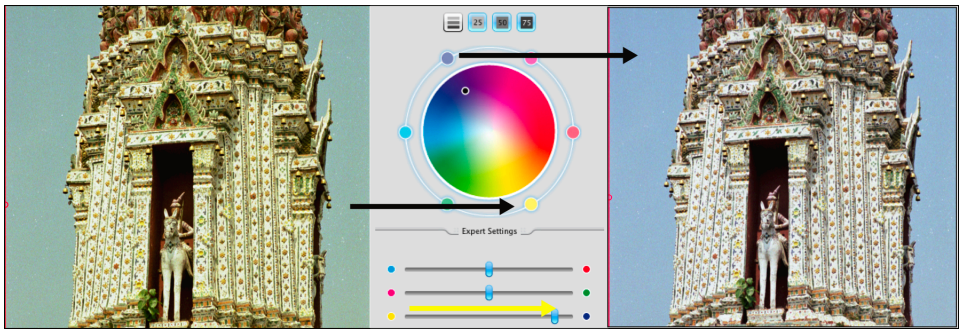
(4) To eliminate a **magenta** cast, add green (this neutralizes magenta):



(5) To eliminate a **blue** cast, add yellow (this neutralizes blue):



(6) To eliminate a **yellow** cast, add blue (this neutralizes yellow):



THE GENERAL RULE

IDENTIFY THE HUE OF THE CAST ON THE COLOUR WHEEL AND MOVE OUT OF THAT COLOUR DIRECTLY TOWARD THE EXACT OPPOSITE COLOUR.

---

24. Once finished with **GCC**, click **Continue**. The airplane will land under the **Selective Colour Correction (SCC)** icon and the **SCC** panel will open in the Dock (Figure 10A.13). You use this panel to amend individual colour groups

from the colours they now have to other colours you prefer. You can change hue, saturation and tone (lightness) for each colour group individually. You can also restore the colour of faded media. I provide steps for basic usage here, referencing Figure 10A.13 below. Chapter Eight provides a complete explanation of how to use it.

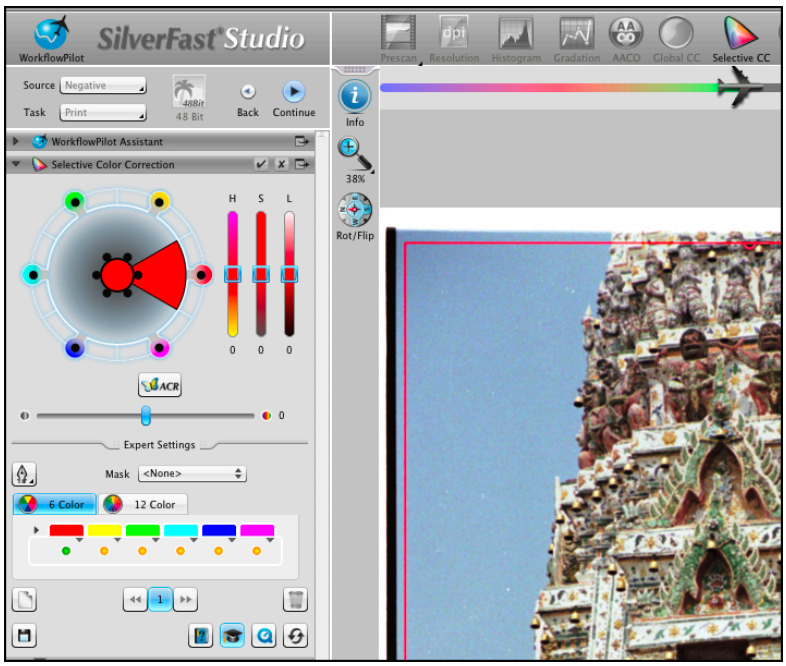


Figure 10A.13 Selective Color Controls

a. **To restore colour to faded media**, locate the ACR slider (just below the colour wheel) and slide it rightward until you achieve the intended effect. (Sliding it leftward will de-saturate colour if you need that).

b. **To change the hue of a colour object in the image**, click on it. The coloured cone inside the colour wheel shows you the colour being amended. Looking at the inner circle in the colour wheel, click on the black dot at the edge of that circle directly opposite the desired colour at the edge of the large circle and drag it toward the desired colour. All the objects having the previous colour will now have the new one. You can make mixed colour by selecting and dragging toward more than one colour to the extent needed. If you wish to restrict the colour change to only isolated objects in the same colour group, you need to isolate them by layering and masking, available in the **Expert** settings as explained in Chapter Eight.

c. **To desaturate a selected colour group**, click on the relevant object in the image. The coloured cone inside the wheel shows you the group being desaturated. Click on the black dot for the colour on the outer edge of the

cone and drag it toward the center. You will see that colour group fades and gradually changes into its opponent colour.

d. **To change the hue, saturation or lightness** of any selected colour groups, use the **HSL** sliders (for Hue, Saturation and Lightness respectively) beside the colour wheel. The **Hue** slider moves the selected colour between its component colour values (for example, cyan can change between blue and green - see Appendix One for information on component and opposite colours). Moving the **Saturation** slider upward or downward increases or decreases the saturation of that colour. Moving the **Lightness** slider up or down increases or decreases the brightness of that colour.

e. **If you had selected <16-bit> (grayscale) as the scan type**, instead of an **SCC** icon, you would get the **SC2G** icon (Selective Color to Gray). This allows you to individually adjust the tones of the grays represented by the underlying colour groups. Use the sliders for the individual colour groups to increase or decrease their related grays brightness by sliding them upward or downward respectively. Chapter Nine provides additional detail on grayscale conversions.

25. Once finished with **SCC/SC2G**, click **Continue**. The airplane will land under the **GANE** icon and the **GANE** panel will open in the Dock (Figure 10A.14). The purpose of this tool is to mitigate grain and noise. To use it and to preview its effects, you must first expand the preview to 100% (being one screen pixel per image pixel), which you do by clicking on the **100%** icon at the top of the panel interface (Figure 10A.14, green arrow). A thin white frame will appear. Position the frame over the area of the image you wish to examine for grain and click. SF8 generates a sharp preview of that area.

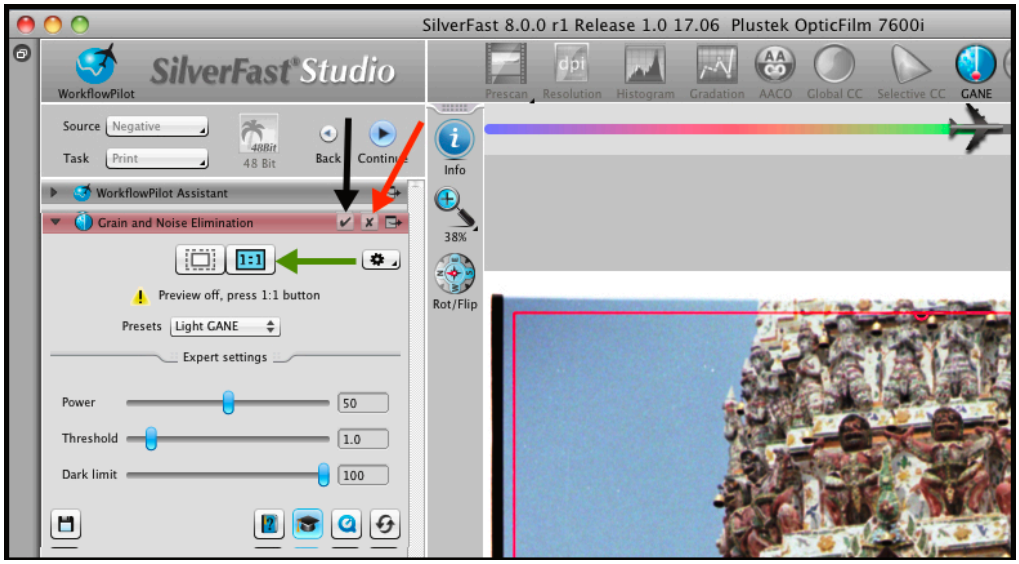


Figure 10A.14 Grain Mitigation Controls (GANE)

You have two choices for using **GANE**: Basic and Expert. In Basic mode, you may click on the **Presets** pane and try Light, Medium or Strong **GANE**. In the Expert mode (**Ai Studio**), **Power** determines the strength of the effect. Moving the slider rightward increases it. **Threshold** determines the threshold of noise detection. Moving the slider rightward expands the size of material that would be considered as artifacts. Take care not to sweep away real image detail. Move the **Dark Limit** slider rightward to the extent you wish to exclude an increasing range of darker tones from being impacted with this tool.

If you wish to be sure that **no** GANE is applied to the scan click on the **X** mark in the panel header to remove it (Figure 10A.14, red arrow). To toggle the preview of the effect on or off, click the check mark on or off (Figure 10A.14, black arrow). To get out of the **1:1** preview, click on the icon to the left of **1:1**.

26. Once finished with **GANE**, click **Continue**. The airplane will land under the **USM (Unsharp Mask)** icon and the **USM** panel will open in the Dock (Figure 10A.15).

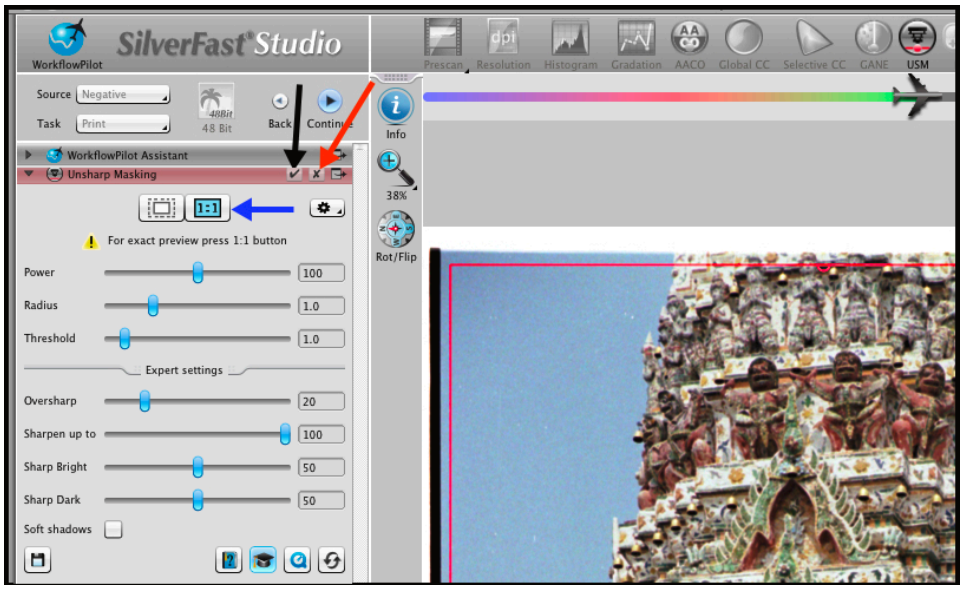


Figure 10A.15 Unsharp Mask Controls

The purpose of this tool is to sharpen the image. It cannot sharpen out of focus images. It improves apparent sharpness of in-focus image areas by finding boundaries between lighter and darker pixels and emphasizing them through lightening the light pixel boundary and darkening the dark pixel boundary. To use it and to preview its effects, first expand the preview to 100%, which you do by clicking on the **1:1** icon (Figure 10A.15, blue arrow). A thin white frame will appear if you hover your mouse over the image. Position this frame where you want to inspect the sharpening and click. SF8

will do a 1:1 prescan of that area, giving you a clear view of the sharpening effects you select.

You have a choice of using the three basic controls (**Power**, **Radius**, **Threshold**) with or without the **Expert** settings (depending on your SF8 version). In the basic settings, **Power** determines the strength of the effect. **Radius** controls the width of the boundaries subjected to the sharpening effect. As you shift both of these sliders rightward, the sharpening effect increases. Be very careful not to overdo these adjustments, because over-sharpened images generally look terrible. Shifting the **Threshold** slider rightward increases the required contrast between edges before sharpening will take effect, thereby decreasing sharpening as the slider is moved rightward.

In **Expert** mode:

- **Oversharp** reduces the effect of artifacts around the sharpening edges, with complete suppression at zero, and decreasing suppression as the slider is moved rightward. The effect is quite subtle.
- **Sharpen Up To**: This control determines up to what level of image darkness the sharpening effect takes hold. As you shift the slider from left to right, the tonal range starting from white (0) and moving through gray onward to black (100 at the far right) included in the sharpening increases. The idea underlying a value somewhat less than 100, is that dark areas often contain more visible noise, which it makes sense not to sharpen. The effect is quite subtle.
- **Sharp Bright, Sharp Dark**: As you shift these controls rightward they expand the light and dark contours respectively that the USM filter purposely creates at the edges to be sharpened. The appearance (really, the illusion) of sharpness depends on how you set these sliders. Good sharpening technique produces the illusion of sharpness created by these contours, without the contours themselves being obvious in the output. I recommend increasing them from their default values carefully, to prevent the image from looking crunchy and over-sharpened.
- **Soft shadows**: Checking it smoothens dark shadow areas. This effect is quite subtle.

If you wish to toggle the preview of the sharpening effect on or off, check and uncheck the checkmark box under the black arrow (Figure 10A.15). If you wish to be sure that **no USM** is applied to your scan, click on the **X** mark to remove it (Figure 10A.15, red arrow). To get out of the **1:1** preview, click on the icon to the left of **1:1**.

A Word to the Wise about Grain Reduction and Sharpening

Please be mindful of the fact that once you implement grain mitigation and sharpening in SF8 (not using SilverFast HDR) at the scan stage and you perform the scan, the effect of these settings is "baked-in" to the image scan. If you find later on that you don't like what you did, you will need to rescan the original media. As well, these tools do not allow for performing localized grain mitigation or sharpening (i.e. having different strength or character of these effects in different parts of the image). If either of these factors may be a concern to you, I recommend that you avoid both grain mitigation and sharpening at the scan stage, and instead use bespoke tools in post-scan image editing applications, such as SilverFast HDR, Lightroom or Photoshop.

27. Once completed, click **Continue**. The airplane will land under the **ME** (**Multi-Exposure**) icon (Figure 10A.16). There is no panel for this tool. It is either ON or OFF. By default, when the airplane lands at this icon, it is switched ON. Multi-Exposure does an additional exposure for the shadow areas of positives and highlight areas of negatives, revealing additional detail as feasible. If you wish to NOT use it, click on the icon, and it will be moderately grayed-out, meaning inactive (Figure 10A.16, right side). (In **Preferences>Special** you may place a checkmark in the box beside **Multi-Exposure Preview**. This will allow you to preview the effect of **ME**.)

Figure 10A.16 Multi-Exposure ON/OFF

28. Once finished with **ME**, click **Continue**. The airplane will land on **iSRD**. The iSRD panel opens in the Dock (Figure 10A.17). It is necessary to click on the **1:1 Preview** button (Figure 10A.17, blue arrow) to enable a preview and implementation of **iSRD**. If you leave the **Correction** mode on **Automatic** (Figure 10A.17, green arrow), you need to do no more here. The tool will automatically identify and remove dust and scratches.

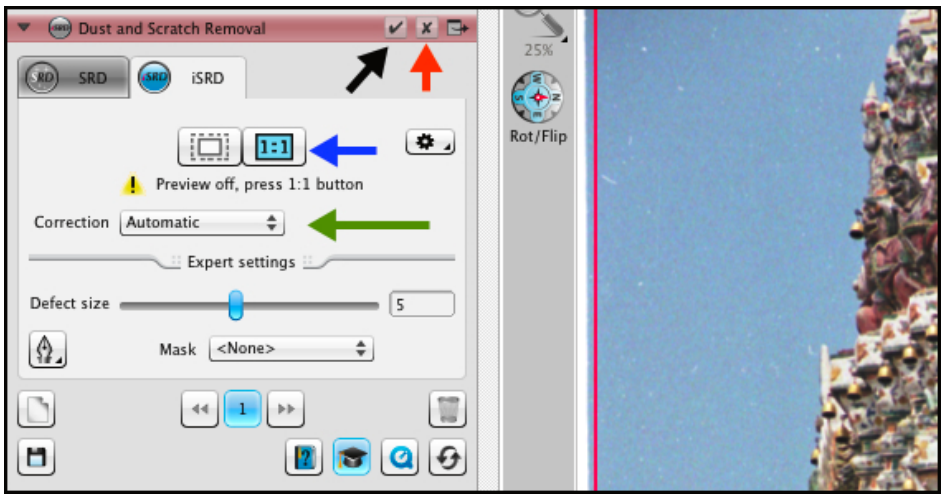


Figure 10A.17 Infrared Scratch and Dirt Removal

29. Otherwise you may click on the **Correction** dropdown. It will open several options allowing you to **Mark** the image (identify the debris – it will all appear in red streaks and spots, Figure 10A.18), **Correct** it, or see the **Original**. You may also click on the grad-cap to see the **Expert Settings**. Here you can alter the **Defect Size** you do not wish to exceed in the identification stage by clicking on the blue handle of the slider and dragging it leftward or rightward to reduce or increase the defect size respectively. In the **Ai Studio Edition** you also have access to up to four layers for isolating the effect of **iSRD** (please see Chapter Six for detailed instructions on masking **iSRD**.

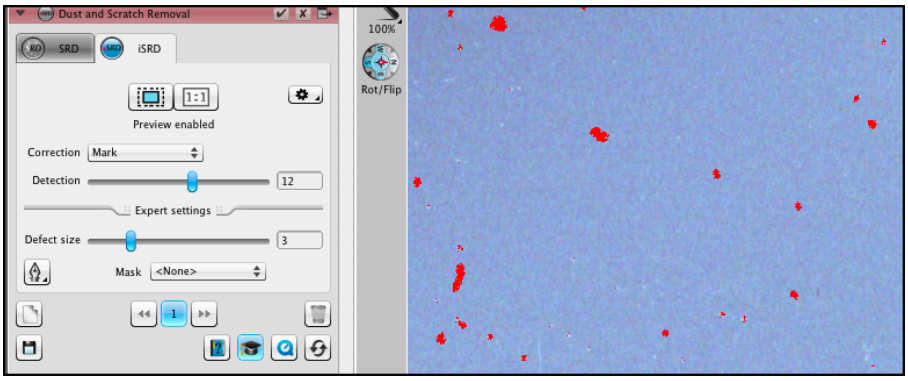


Figure 10A.18 iSRD Dirt Marks

30. Once finished with **iSRD**, click **Continue**. The airplane lands under the **File** icon. Another section of the **Scan Dimensions** panel opens in the Dock (Figure 10A.19). Enter a file name in the pane beside **Name** (Figure 10A.19, red arrow) and specify the file format by clicking on the file format pane beside the **Name** pane (orange arrow). The choices are **TIFF, PSD** and **JPEG2000**. Click on the file format you want. (If an external application in which you may be opening the image does not support JPEG2000, use TIFF instead.) Then click on the blue folder icon (black arrow). This will open your Finder (Mac) or Windows Explorer folder structure. Select the folder in your

hard drive where you want the scanned image stored and click **Choose** (green arrow), or **OK**. This is the last stop before scanning. The size of the file you will be scanning is shown in MB (Figure 10A.19, brown oval).

Figure 10A.19 File Naming and Saving

31. I recommend that you then click on the **info** icon (to the left of the airplane path). This will open a text file allowing you to review everything you've done before scanning. If you are satisfied with the previous steps, I recommend that you save this information along with the scan by clicking on the **Save** button in the info panel and naming the file consistently with your image file. If you wish to amend any steps, use the **Back** button (immediately to the left of the **Continue** button) to revert to the step you wish to amend and then change it.

32. Click **Continue**. SF8 will scan the image to the selected folder (Figure 10A.20). The progress of the scan shows in the progress bar (Figure 10A.20, red arrow) and the dynamic icon immediately to the left of it. If you wish to cancel the scan, click on the **X** (Figure 10A.20, blue arrow).

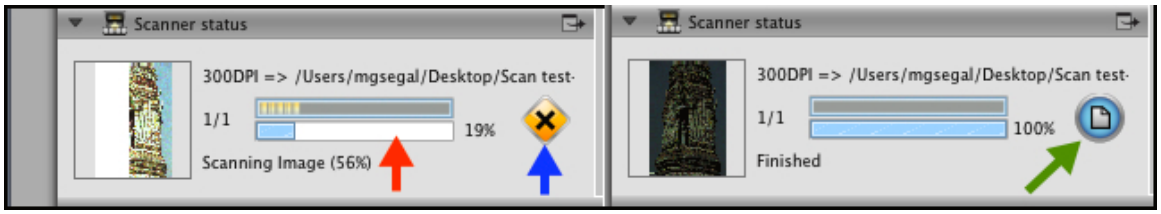


Figure 10A.20 Scan Process: Left in Progress; Right Completed

When the scan is complete, you may open it in your external editor by clicking on the **File** icon (Figure 10A.20, green arrow). The image will open in the application to which you have the file format associated (for example, in your computer OS, if you have associated Photoshop with TIFF and your file is a TIFF, it will open the file in Photoshop, but if your file were a JPEG and you had associated JPEG with Preview, it will open the file in Preview.)

As well, SF8 reverts to **Manual Mode** and all the panels that you used for creating the image become available in the Dock. If you wish to rework any part of the editing process manually, click on the little arrow to the left of the panel name to open that panel, make your edits and then rescan the image by manually clicking on the **Scan** button, which is the last one in the row of icons above the image Preview.

(B) Maximum SilverFast (Manual Mode) step-by-step:

1. Turn on the scanner.

2. Open SF8; if necessary, select the scanner from the drop-down menu of the opening screen and click **Start** (Figure 10B.1, red and black arrows).

Figure 10B.1 Start

3. Go to **Preferences** (Figure 10B.2) and make sure that the application is set-up to suit your requirements for the job at hand in every tab of the Preferences panel. Especially for colour management – **Preferences>CMS.** I recommend selecting your scanner profile as the input profile, and either ARGB(98) or ProPhoto RGB as the internal colour space (Chapter Three).

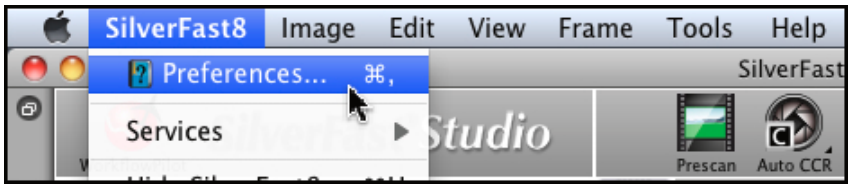


Figure 10B.2 Access to Preferences (Mac)

4. If it is not already red, click the workflow icon (the globe with aircraft) in the upper left corner of the interface to make it red (Figure 10B.3).

Figure 10B.3 Workflow Mode and Scan Type

5. Insert the slide into your scanner.

6. Start with the **scan type** icons in the row below the red globe (Figure 10B.3). Click the leftmost icon and select the kind of media you are scanning (in this example **Transparency**).

7. Click the next icon to the right and select the type of transparency (here, **Positive**).

8. Click the next icon to the right and select the scan quality (here, **48-bit**)

9. Leave the **Frame** icon alone for now. It isn't important to the current workflow example.

10. Click the **Prescan** icon (Figure 10B.3, red arrow). The **Picture Settings** panel with **Output Histogram** will open in the Dock (Figure 10B.4, partial view).

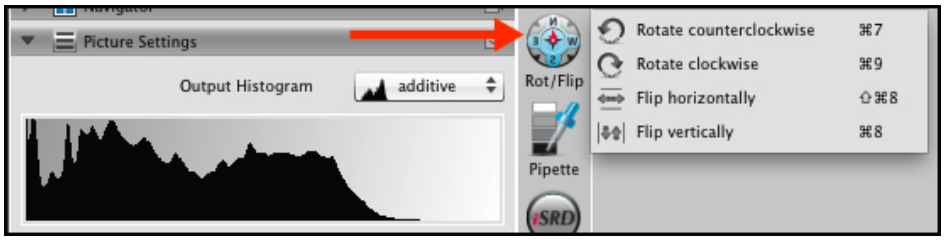


Figure 10B.4 Output Histogram; Orientation Tool

11. The image fills the Preview window. If its orientation is not correct, click on the **Rot/Flip** tool in the tool column (Figure 10B.4 red arrow); four ways of re-orienting the image present themselves. Click on the appropriate commands until the image is correctly oriented (details in Chapter Four).

12. Click and drag the red frame (Figure 10B.5) from any side necessary to crop and tilt the image as you wish (Chapter Four). The scanned photo will be the material you keep within the red scan frame, reflecting any tilt, but untilted.

13. Open the **Scan Dimensions** panel (immediately under the **Scan Type** icons I've just been using) by clicking on the tiny triangle to the left of the name (Figure 10B.5, red arrow). Follow the instructions given in Chapter Five for

populating this panel with the necessary information. In this example I am informing it as follows:

- **Name**: Gilman Kilimanjaro (my example - photographed in January 1971, around 8:00 AM; Agfachrome)
- **File Format**: TIFF
- **Path**: User/mgsegal/Desktop
- **Just beside Path,** you may click the **IPTC** button and save to the scan file descriptive information about the image.
- F**ormat**: Custom
- 360 ppi
- **Expert Settings: Width, Output:** 9 inches
- **Expert Settings: Height, Output** (automatic with locked aspect ratio)

Figure 10B.5 Dimensions, Frame, Densitometer

14. The panel below **Scan Dimensions** is the **Densitometer**. Set your readings preferences as described in Chapter Seven. Either leave it open in the Dock, or float it and place it in a conspicuous location adjacent to the image you will be editing (Figure 1B.5, right side, where I selected **Lab** as the information read-out format allowing me to read luminance data and colour data independently of each other). **Lab** is not selected as a file format by doing this.

15. Look at the image colour balance and decide whether you think it needs a global correction. In this image, I think it does - the "snows of Kilimanjaro" seem to have quite a cyan/blue cast, as confirmed by the L*a*b* value of **-3a, -9b** for the sampled point. I think the **Neutral Pipette** (Chapter Eight) can reset the colour balance correctly. Using it as described just below, it rebalances the image's colours (Figure 10B.6, red arrow). The sample point now reads **a0, b0**, as it should. The photo is dark, but I'll get to that below.

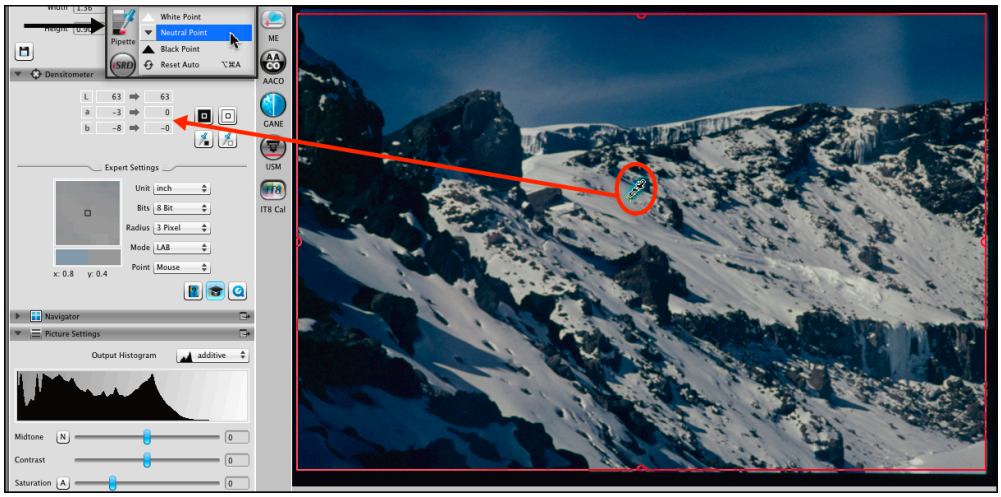


Figure 10B.6 Colour Balance with Neutral Pipette

To use the Neutral Pipette, click on the **Pipette** icon in the tool column (Figure 10B.6 upper left inset, black arrow) and select **Neutral Pipette** (here highlighted in blue). Then click on a point in the image you wish to neutralize (Figure 10B.6 red oval and red arrow). In the Ai Studio version you may set up to four such points in different parts of the image.

16. If you think the overall colour balance needs more adjustment than you have been able to accomplish with the Neutral Pipette, open the **Global Color Correction** (**GCC**) panel and make further adjustments there, as described for this tool in Chapter Eight. I get to selective colour adjustments below.

17. Now that you have corrected the overall colour balance, check the image and the Output Histogram for luminosity. For example, I think this image is under-exposed. This is confirmed looking at the **Output Histogram**, where the bright (right) end of the tonal scale is rather lacking in image data (Figure 10B.6). Two ways of brightening this image are to shift the **Midtone** slider under the **Output Histogram** as far as necessary (Figure 10B.7, red arrow; here all the way rightward), and in the **Histogram** panel (accessed by clicking the **Histogram** icon in the tool row atop the interface) resetting the white point by clicking and dragging it from 255 to 222. (Figure 10B.7, blue arrow; dragging a white point control leftward increases overall brightness and contrast by remapping lower highlight values to higher values).

Figure 10B.7 Luminosity Adjustments - 1

18. Both the image and the histogram indicate some plugged shadow areas. Though it may not have a major effect on revealing additional shadow detail (partly depending on the quality of your scanner), I recommend enabling **Multi-Exposure** by clicking on the **ME** button in the tool column.

19. If you think any individual colours need selective attention, click on the **SCC** icon in the top toolbar (the panel opens in the Dock), and make any necessary edits (Chapter Eight). In this image, the hue of the sky is rather more cyan than natural, so I clicked on the sky and moved the **H**ue slider very slightly toward blue and increased its **L**ightness a bit (Figure 10B.8). These changes really are modest, and the controllers very sensitive; hence I advise caution. Comparing Figure 10B.7 with 10B.8, you may observe that the sky now looks more like how an early morning blue sky on the equator can be expected to look.[32] If you compare 10B.8 with 10B.5 you will see we've come a long way with this image in just a few clicks and drags.

(In this image, the snow has a slight blue cast, which is normal, but would also be affected by general SCC edits to blue. In this instance, the lightening of the blue sky also helped the snow, but that need not be the case in all such images. When an image has separate areas of the same colour group that need different treatment, the solution in SF8 will be to use layers and masks to mask-in custom edits for each area, as laid-out in Chapter Eight.)

[32] By the way, I've heard much of the snow and ice that existed on this summit forty years ago is no longer there. This attests to the value of scanning your memories before the media degrades too extensively – but if you've reached this far with us, you knew that already.

Figure 10B.8 Adjustment of Sky Blue

20. Reduce grain (if you think it necessary) by using the GANE tool, which you access by clicking on the GANE button in the tool column (Chapter Six).

21. Sharpen the image using the USM tool, by clicking on the USM button in the tool column (Chapter Six).

22. For cleaning the image, click on the iSRD button and follow the instructions provided in Chapter Six for using it.

23. Review everything you've done by clicking on the "***i***" button at the top of the tool column. Make any necessary readjustments. I recommend saving this information to a bespoke folder on your hard drive, with a file name corresponding to the image file name, for ease of future reference.

24. Click **Scan**. The **Scanner Progress** panel displays scan progress.

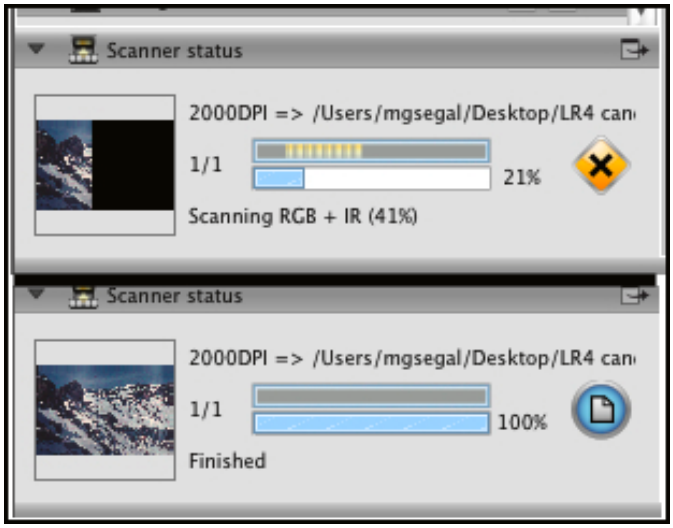


Figure 10B.9 Scan in Progress

Well, it only took twenty-four easy steps, but I've made a scan maximizing the use of SF8 for all editing operations, and obtained a very decent outcome.

(C) Minimum SF8 to Lightroom step-by-step:

The opposite end of the workflow spectrum is to minimize the use of SF8 and do as much as possible in external applications, in this variant - Lightroom.

1. Please see the instructions in Chapter Two for creating a direct path between SF8 and Lightroom. If not, remember the folder to which you save the scan; then use Lightroom's Import function to bring the scan into Lightroom.

2. There are choices for colour-managing a scan destined to Lightroom, discussed in the last section of Chapter Three. I recommend embedding the scanner profile and an RGB colour space in SF8.

3. In this workflow, Steps (1) to (13) inclusive from Workflow (**B**) just above are still required, except:

4. In Step (8) select **48-bit** for print or **48>24-bit** for web or devices only. With this group of settings you now have what is commonly called a "raw scan", apart from colour management and the **Gamma** setting discussed immediately below.

5. In **Preferences>General**, bottom row, set **Gamma Gradation** to 2.2 (or to taste, but greater than 1.0). I recommend this for better display to output matching, to provide adequate contrast and brightness embedded in the scan and to enable more successful editing in Lightroom than otherwise possible.

6. Implement steps (22), (23) and (24) above, as it is best to use iSRD for clean-up, to review your settings before scanning, and then of course to produce the scan.

7. Once in Lightroom, you will perform whatever image edits you need there in the **Develop** module, then progress within Lightroom to its Output modules (**Web**, **Slideshow** or **Print**). You may then **Export** the file to a folder on your hard-drive, or open it in Photoshop as a **Smart Object**. The advantage of this option is that if you wish to work between the rendered Photoshop file and the original Lightroom file, the **Smart Object** gives you immediate access to the same file in **Camera Raw**, whose image adjustment tools and processing are the same as in Lightroom, except for the user interfaces, which differ.

I find Lightroom's noise reduction tool works well for mitigating grain. As well, Lightroom's sharpening tools are very effective, be it capture sharpening or output

sharpening[33] . (Output sharpening becomes available when you enter the output modules.) An important feature working in Lightroom, as in SilverFast, is that you need not concern yourself about the order in which you implement most of its controls, because the program optimizes the processing hierarchy when you export the image from the application. Such is not the case in Photoshop, where order matters.

Another feature of Lightroom I much appreciate is its rather unique ability to render shadow detail while preserving contrast by increasing **Fill** and compensating it with increased **Black**[34]. Please see Figures 10F.3 and 10F.4 in workflow (**F**) below.

(D) Minimum SF8 to Photoshop step-by-step:

Please repeat Steps (1) to (13) inclusive and Steps (22), (23) and (24) of Workflow (**B**). Then open the image in Photoshop and do all your editing there. As I've mentioned before, the order in which you implement processing steps and stack the layers matters in Photoshop.

The processing order in Photoshop would be:

a) Do any needed transforms on a duplicate image layer
b) Flatten Image when you are sure they are correct
c) Add a duplicate image layer for grain reduction
d) Mitigate grain (Chapter 6)
e) Implement Capture Sharpening (Chapter 6)
f) Implement other tone and colour edits
g) Implement other changes as needed
h) Save and output.

A typical resulting layer stack would look like that of Figure 10D.1. I comment on several aspects of the grain mitigation and sharpening procedures, and then provide a more detailed workflow for both. These layers create large file sizes, but I recommend that you NOT flatten the grain reduction and capture sharpen layers until you are certain you will not need to revisit them – ever.

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[33] Readers unfamiliar with the concept of a multi-stage sharpening workflow should consult: "Real World Image Sharpening with Adobe Photoshop; Camera Raw, and Lightroom" Second Edition, by Bruce Fraser and Jeff Schewe; Peachpit Press, 2010.
[34] These controls are amended in Lightroom 4, but the changed controls perform the same kind of adjustments, only further improved.

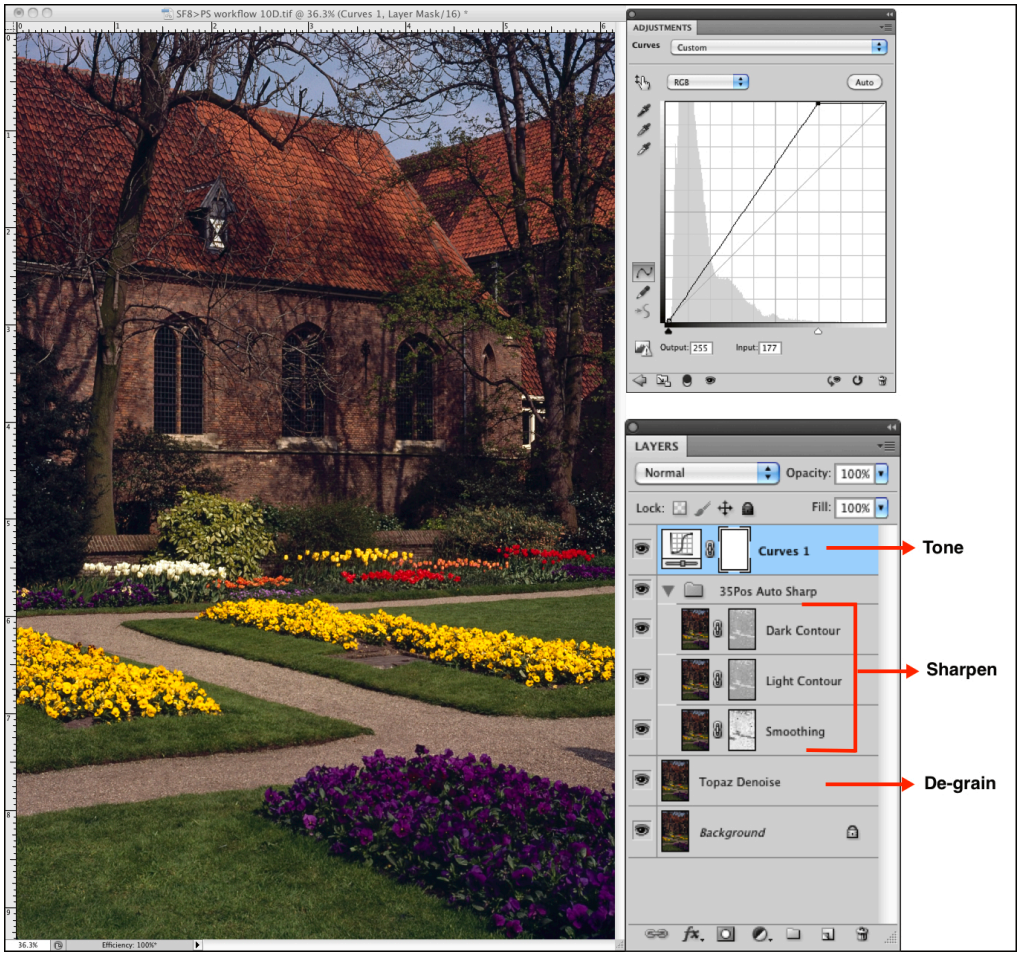


Figure 10D.1 Processing Order of SF8 Scan in Photoshop

Before implementing Step (c) I recommend that you examine the photo to see whether it needs grain mitigation at all, or only in certain places where grain is disturbing, or everywhere. I find that while colour negative films usually need some grain mitigation, lower speed transparency films, especially Kodachrome, often don't need it. If you need to mitigate grain, do so before sharpening, because sharpening adds halos to the grain, only making grain mitigation more difficult. Then sharpen the grain-mitigated photo.

When you mitigate grain, no matter how good the application used for doing it, there is always *at least* a minor trade-off between grain mitigation and fine detail. The less that trade-off needs to be, the better. This depends partly on the application used, partly on the grain mitigation strategy adopted (targeted or general) and partly on the skill of the operator. The main approach for mitigating grain in some parts of the image but not others, is to mitigate it generally on a bespoke image copy layer, then add a **Reveal All** layer mask, and with the layer mask active, paint in black those areas of the image that should <u>not</u> be affected by grain mitigation. This conceals the effect of grain mitigation in those areas.

It so happens that the better applications for reducing noise from digital cameras are also adept at recognizing grain in scanned film and can deal with it too. There are a number of such applications, the best known being Noiseware, Noise Ninja, Neat Image and Topaz DeNoise. While all of them can produce roughly similar results, I use Topaz DeNoise to illustrate the general approach.

The **step-by-step** for grain mitigation is as follows:

1. Open the image in Photoshop.

2. Create a duplicate image Layer (CMD/CTRL J) and keep this Layer as the active one.

3. Open Topaz DeNoise (for example) from the Filter menu in Photoshop. The interface will open, it will magnify the preview window to 200% and select a portion of the image to view at this magnification; it may also create a group of settings.

4. I recommend pushing **Reset** to bring all the settings back to zero and moving the image preview till you get a portion of the image which shows the grain against both a low-frequency and high-frequency background having detail you want to preserve.

5. Then gradually shift the **Amount** slider to the right, letting go at frequent intervals. Each time you release the slider, the program will recalculate the grain mitigation and refresh the preview. Clicking on the preview and holding the mouse button down shows the starting point; releasing the mouse shows the extent of grain mitigation at the current setting. Repeat this process, moving the slider to the right in small increments, until you think you have gone just a very small bit beyond the amount of detail loss you want to permit. This is permissible because there will be recovery of detail in the sharpening phase.

6. Once you are satisfied that you have achieved the optimal balance between grain mitigation and detail retention, click **OK**. The application will process the grain mitigation on the active layer.

7. If you find that you cannot achieve an optimal balance, the cause generally is that the photo needs considerably more grain mitigation than the desirable amount of detail retention can tolerate. In these cases, to the extent possible you want to isolate the image areas where detail is more important than film grain. In peoples' faces, for example, this would usually be the eyes and the lips, but not necessarily the rest of the face. You may want to retain the texture of fabrics, but you don't need detail in the open sky. For these situations, reduce as much grain as necessary in the areas where detail retention is <u>un</u>important. Click OK. In Photoshop, add a "Reveal All" Layer

Mask to the grain mitigation layer, activate the Black paint brush, set the opacity to about 30% and gradually paint out the grain mitigation in the areas where you particularly want the detail to show through.

8. Magnify the image to 100% and examine the result. If you are satisfied with it, save for a bit of detail to be recovered in sharpening, grain mitigation is completed. If you are not happy with the outcome, you may trash the grain mitigation layer, create a new one and redo the grain mitigation in Topaz DeNoise.

9. While there are other controls in Topaz DeNoise, I find that for mitigating film grain, the **Amount** slider is the most effective one, and, in fact the only one I find it necessary to use.

Sharpening film scans is a fine art. Achieving the right character and amount of sharpening, especially for scans from negative film, benefits most from an application having considerable flexibility for treating images in different ways, depending on their content. There are several available.

I prefer **Pixelgenius Photokit Sharpener Pro 2** (**PKS**). It offers a completely reversible sharpening workflow, with many different kinds of sharpeners, all controllable by adjusting the opacities of the sharpening layers it creates.

My colour negative scans are from ASA 100 or 200 films. I generally find that using **PKS** Capture Sharpen for **35mm Positive Film**, or **35mm Negative Film** or **6*6 Positive Film** – all set to **Auto Edge Sharpen** or **Creative Sharpener > Sharpening Effects > Luminance Sharpening 1** (**or 2**) is all the image needs, with no follow-up output sharpening. When output sharpening does seem indicated, it is usually at reduced layer opacity, as the full effect can be excessive. It is best to examine the effect of sharpening at 50% or 100% magnification in Photoshop. These recommendations may be specific to the scanner. The choice of sharpeners and their strength most appropriate for different scanners could vary; hence, I encourage users to experiment. The main point is that the application has enough choice and flexibility to address virtually any requirement very well.

After grain mitigation and capture sharpening, perform any other edits the image requires on separate layers or Adjustment Layers, to preserve reversibility.

(E) Hybrid Strategies - SilverFast HDR

There is, of course, no particular reason to adopt either a minimalist or maximalist approach to the use of the tools available in the scanning software. As I've said before, digital imaging technology is rich with alternatives for achieving a result; therefore it makes sense to "mix and match", especially when images raise challenging editing requirements (such as shadow detail, discussed in Appendix 5).

In this context, there is considerable merit to the SilverFast HDR workflow, because it gives you the flexibility to create unadjusted scans and revert to them as often as you like for experimenting with different combinations of editing inside and outside of SilverFast, causing no impact on the integrity of the original scanned data. The best way to do this is to acquire the SilverFast Archive Suite, including both SF8 and SilverFast HDR applications and following the workflow steps explained in Chapter Two for migrating the image from SF8 to SilverFast HDR. Once in the latter, you have all the luminosity and colour editing controls and most of the other tools that are available in SF8, but here you can change the appearance of the image without rescanning,

SF8>SilverFast HDR>Adobe Lightroom step-by-step:

(a) In your computer:

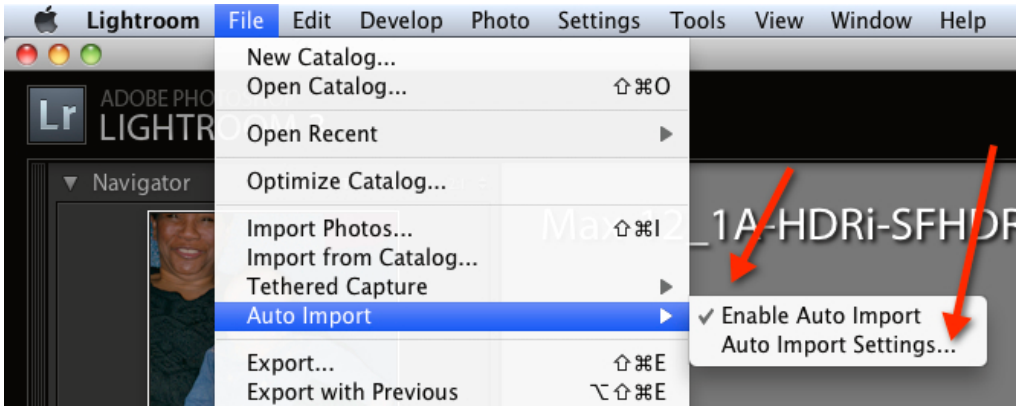
1. Create a folder in your hard-drive called for example **Scan Watch**.

2. Create another folder in your hard-drive called for example **SilverFast Output**.

3. Within the **SilverFast Output** folder, create a sub-folder with a name relevant to the series of images you are scanning into that sub-folder, for example **Series-1**.

(b) In Lightroom (Version 3.x or Version 4.0):

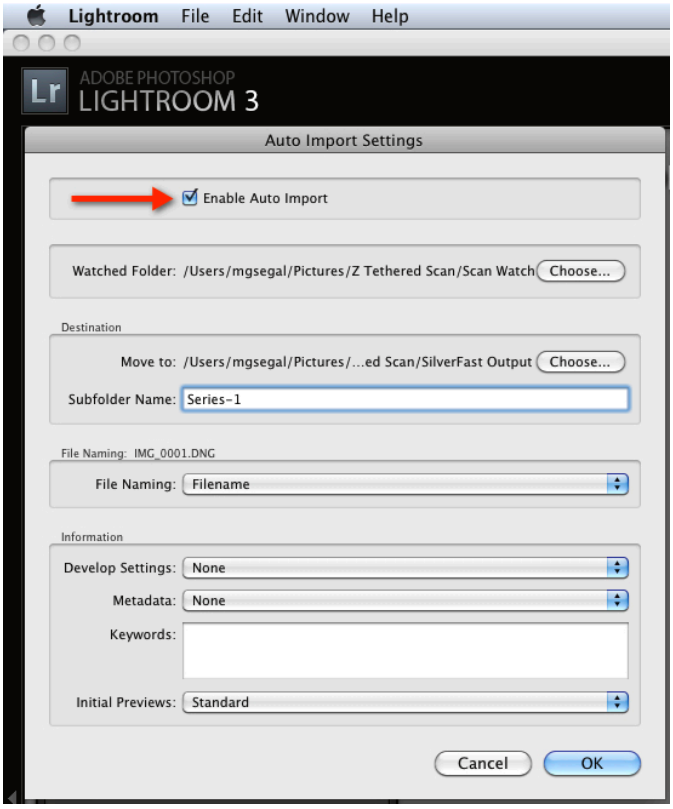
4. Go to **File>Auto Import>Auto Import** and configure as follows: click on **Auto Import Settings...** The dialog opens. (Unless you have done this before, the **Enable Auto Import** option just above **Auto Import Settings...** will be unavailable. This is not a problem. Once you've configured the **Auto Import Settings**, the option becomes available and you can select it.)



10E.1 LR Auto Import

(a) For **Watched Folder** click **Choose**, browse to the hard drive folder **Scan Watch**, select it and click **OK**.

(b) For **Destination**, click **Choose** and browse to **SilverFast Output**, select it and click **OK**.



10E.2 LR Auto Import Destination

(c) In the Sub-folder pane, enter the exact name you gave to the subfolder created in step (a)3 above, which was **Series-1**.

(d) For **File Name** I recommend that you keep **Filename**. This will convey the same filename you gave the scan in SF8 all the way through the process.

(e) For **Information**, add any other information of the type offered which you want saved with the image file.

(f) Check the box on top **Enable Auto Import**.

(g) Click **OK** to accept the whole configuration.

5. In the **Library** Tab, left side, make sure the Catalog folder **Previous Import** is selected.

6. Leave Lightroom open (useful but not essential – the process will work upon opening Lightroom and selecting the **Previous Import** location in the **Library** Module).

(c) In SilverFast HDR:

7. Select your **Preferences** before scanning anything,

8. For setting up **Preferences**, please revert to Chapter Three – **Preferences** for SF8, as all the options are the same.

9. Quit SilverFast HDR.

(d) In SF8:

10. Turn on the scanner, open the application, select the scanner and insert your media.

11. In **Preferences>General**, I recommend selecting a Gamma Gradation of 2.20 and checking the box saying **for HDR output** (the box turns blue with the checkmark). While the original HDR archive scan itself will retain a Gamma of 1.0, the setting recommended here will give the **processed** HDR image Gamma 2.2 and this is the value that will apply in external editors such as Photoshop and Lightroom. You can use lower Gamma values but they may give you unacceptably low brightness and contrast from which to start improving the image.

12. In **Preferences>CMS**, I recommend:

- **Colorsync** for **Input>Working Space** and **Working Space>Monitor**;
- **<RGB>** for **Working Space>Output.**
- For **Input** use the dropdown menu to select your scanner profile.
- For **Internal** you may select **Adobe RGB(1998)** or **ProPhoto** (recommended if printing in today's wide-gamut inkjet printers);
- For **Rendering Intent**, select **Perceptual** or **Relative Colorimetric**.
- Check on the box beside **Embed ICC Profile** (the box turns blue).

(Please see the note on Colour Management at the end of this section)

13. In the **Image Type** options bar at the head of the dock, from left to right:

- First icon: Select **Transparency**
- Second Icon: Select **Positive, Kodachrome or Negative** depending on the film type
- Third Icon: Select **64-bit HDRi,** or **48-bit HDR** if you do not want **iSRD** to work in SilverFast HDR**;**

14. In the Scan Dimensions panel (in the dock):

- Name the file and select a format, e.g. **TIFF**.
- For **path**, select the path to the **Scan Watch** folder and click **Choose**.

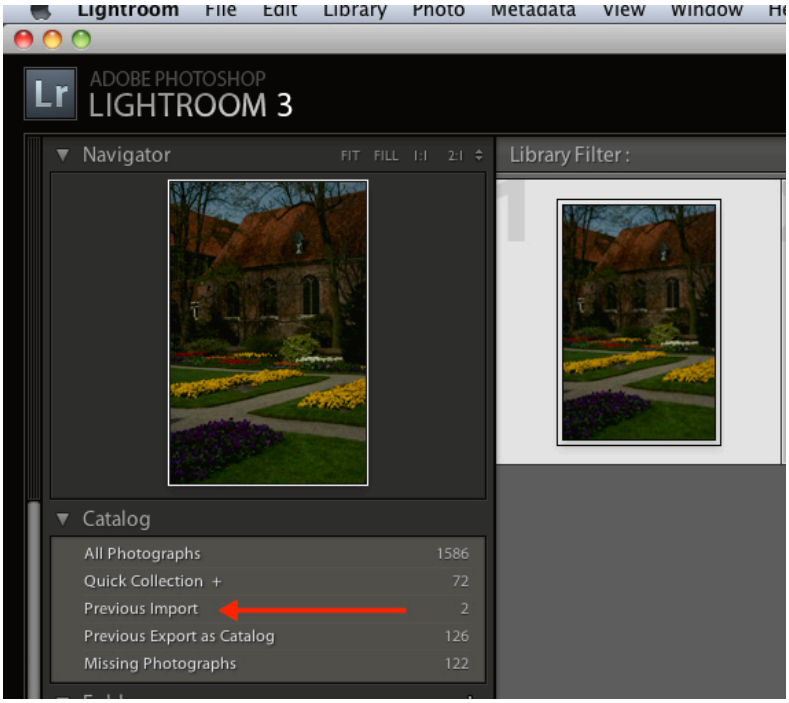
- Select the output resolution in the **Preset** line, for example 360 ppi.
- In the **Expert Settings**, enter **width** and **height**.

Because you are making an HDR scan, there is nothing else to adjust other than whether or not you want **Multi-Exposure** enabled. To enable it, click on **ME** in the vertical tool bar. (If you change your mind, to deselect it, click it again.)

15. Click **Scan**

16. The image will scan to the **Scan Watch** folder and then automatically depart from that folder into the **SilverFast Output** folder. You now have a SilverFast HDR scan ready to use in Lightroom.

17. If you switch over to Lightroom you will see the image in the **Previous Import** preview window of the **Library** module (Figure 10E.3).



10E.3 HDR Scan Opens in Lightroom

Not to lose track of strategy here, I am pursuing three objectives at once:

a. Always retaining an original unaltered HDR scan on the hard drive;
b. Being able to edit and Process the file in SilverFast HDR;
c. Being able to use Lightroom to edit the original unedited HDR file and/or the HDR file as already processed in SilverFast HDR.

You automatically achieve objective (a) by renaming the file upon **Processing** it in HDR and/or **Exporting** it from Lightroom, regardless of whether you keep

everything in the same folder or not. As long as you do this, there will always be a separate, original archive of the unedited HDR scan in its designated folder.

18. At this point you have a choice of working on the image either in SilverFast HDR or in Lightroom or in both. If you would like to make any image adjustments in SilverFast HDR, **please do so before using Lightroom**, as Lightroom adjustments could then build on the adjustments done in SilverFast HDR. So let us do both, in order to see how it all works together (yes, it does!) Important: if you scan a colour negative using an HDR mode, you MUST **Process** it in SilverFast HDR first, otherwise it will open in Lightroom or Photoshop as a negative.

19. Open SilverFast HDR.

20. Open the image in SilverFast HDR by clicking the **Open** icon (Figure 10E.4, red arrow), migrating to your **SF Output>Series-1** Folder and selecting it.

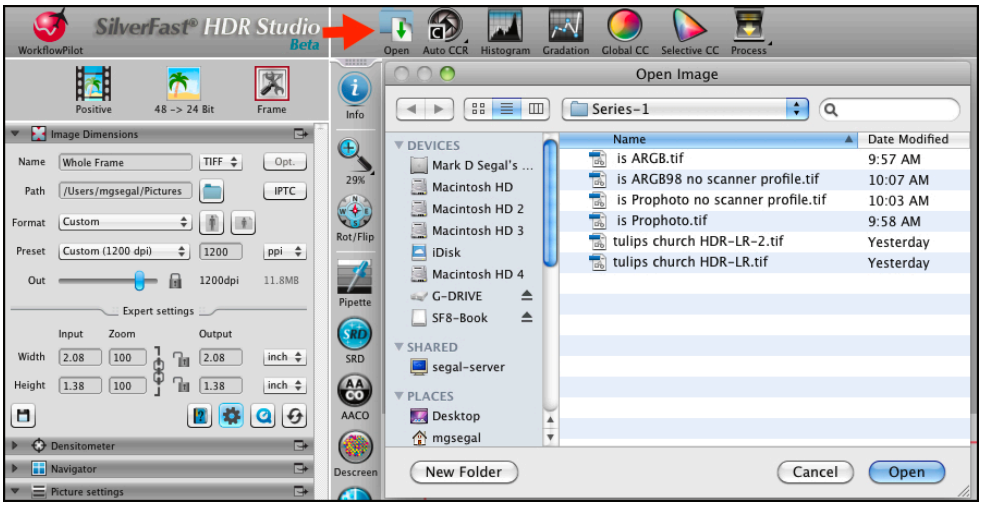


Figure 10E.4 Opening HDR Scan in SilverFast HDR

21. In HDR **Scan Dimensions**, select the image dimensions and resolution, as you would in SF8. Change the file name slightly. For the destination folder in which to save the photo, select the path to **Scan Watch.**

22. Make any adjustments you wish to make in SilverFast HDR. The main differences between the SF8 interface and the HDR interface is that instead of **Prescan** (SF8) in HDR it is **Open** and instead of **Scan** (SF8) it is **Process** in HDR. One important recommendation here: DO NOT sharpen the image in more than one application. If you sharpen in SilverFast HDR, do not use the sharpening tool in Lightroom's **Develop** module. Even if the image needs more sharpening, leave this for the output-sharpen stage.

23. As illustrated in Figure 10E.5, in SilverFast HDR I created a "surrealistic" selective colour change from oranges to greens (compare with Figure 10E.3) and

brightened the image to clearly distinguish the version **processed** in HDR from the original HDR archive scan. Once you are done adjusting the image in SilverFast HDR, click **Process**.

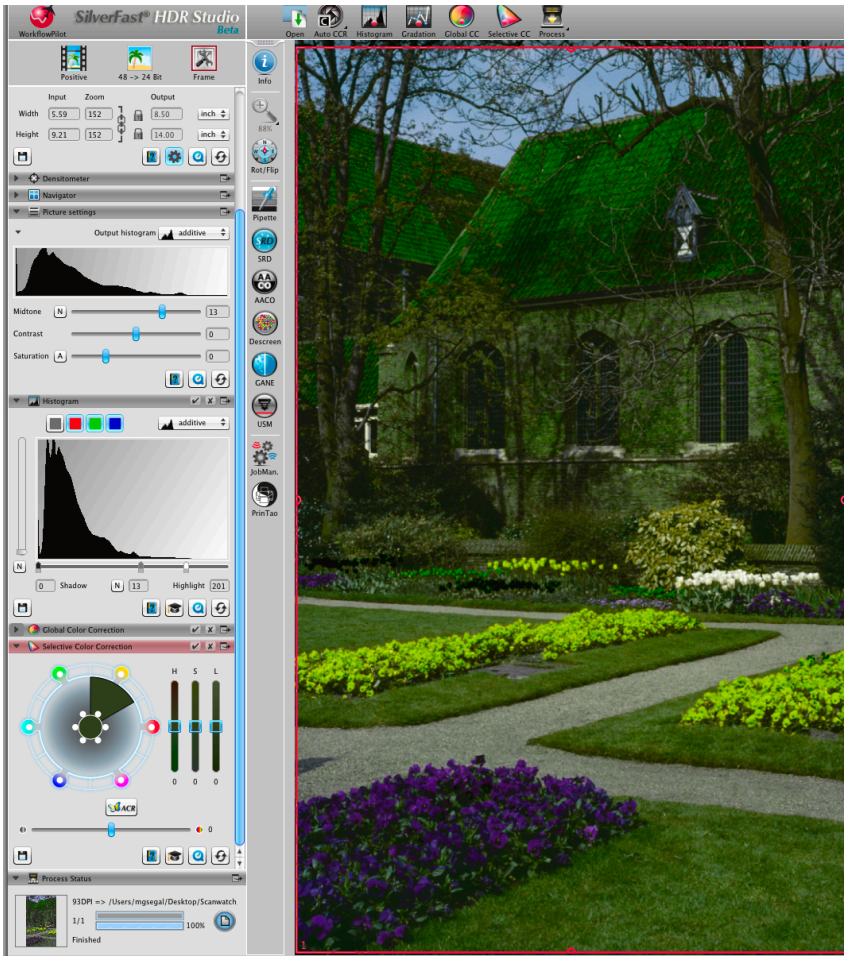


Figure 10E.5 Processed HDR Scan opened in Lightroom

24. As Lightroom is open, it will transfer the file from **Scan Watch** to **SilverFast Output** and add a **-2** to the file name if you did not change it. When you enter the **Previous Import** folder of Lightroom you will now see both renditions of the same photo there: the unadjusted **TIFF** from the scan itself, and the image as adjusted in SilverFast HDR (Figure 10E.6).

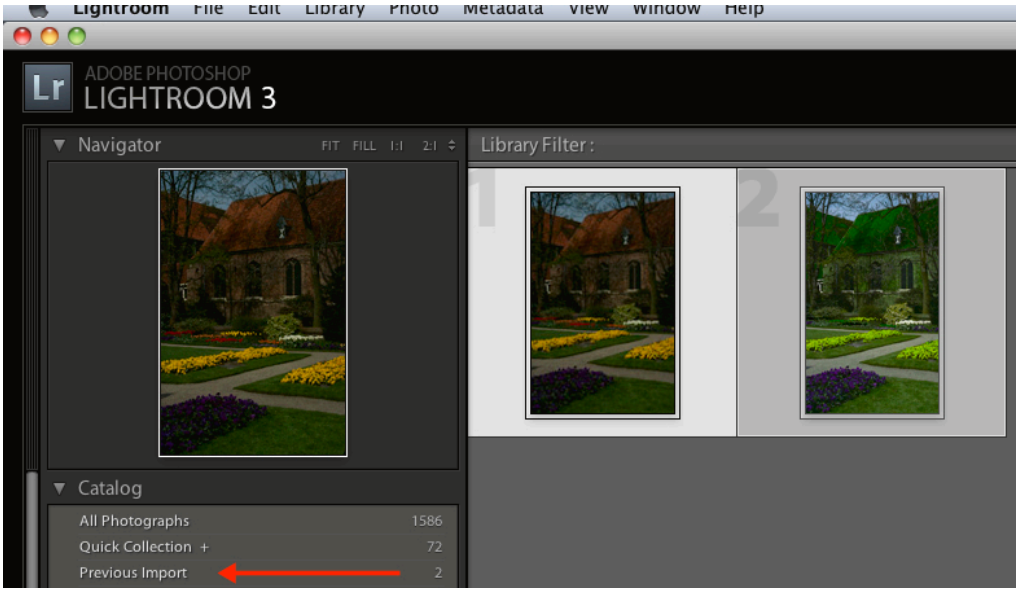


Figure 10E.6 Archive and Processed HDR Scans in Lightroom

25. This set-up gives you the option to carry-on editing either version of the image in Lightroom. Figures 10E.6 and 10E.7 show the results from working on the HDR Archive Scan in Lightroom – remember to export it from Lightroom with another file name if you intend to preserve an unaltered HDR Archive scan.

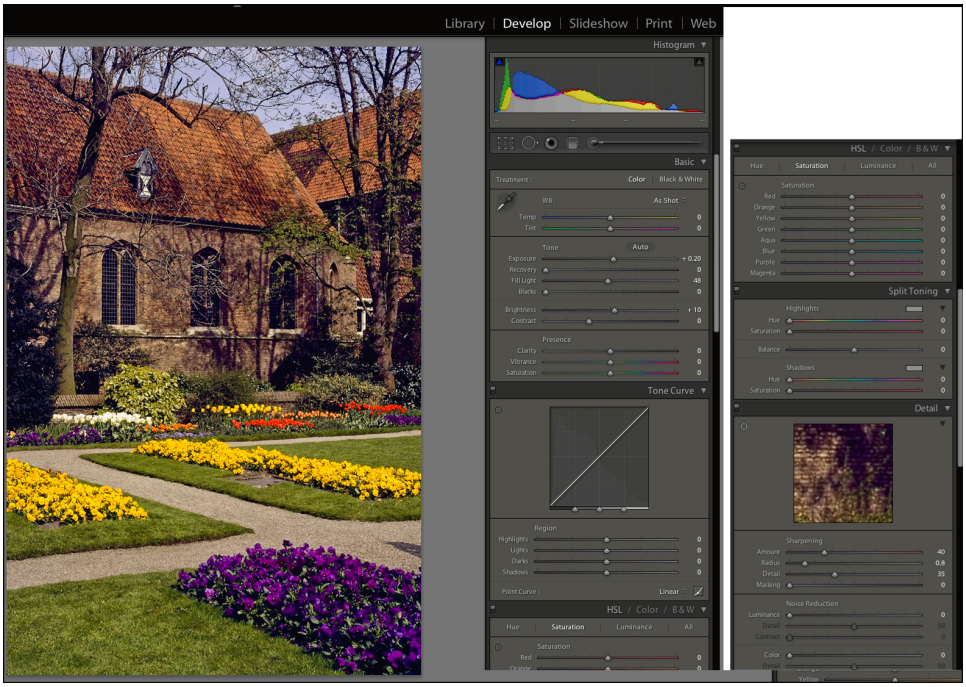


Figure 10E.6 HDR Image Adjusted in Lightroom

Figure 10E.7 Detail of Lightroom Sharpening at 100%

Once you have finished working the file in Lightroom, if there are more things you need to do with it for which you must or you prefer using Photoshop, you can opened the Exported file in Photoshop in the usual way and proceed to work further with it.

SilverFast HDR and Photoshop:

The remaining hybrid workflow involving SilverFast HDR I cover in this section (**E**) of hybrid workflows is the one combining **SilverFast HDR and Photoshop** (no Lightroom)**.** Here's the **step-by-step** (abbreviated).

1. Scan the image in SF8 using one of the HDR picture modes (48-bit HDR, 64-bit HDRi) and save it to a file of your choosing. What I said above (and show further at the end of this section) about colour management settings in **Preferences** applies here too.

2. Open the image in SilverFast HDR as indicated in Figure 10E.4 above.

3. In **Scan Dimensions**, change the file name slightly (or a lot as you wish), select your desired output PPI and file dimensions, and designate the folder to which you want the image processed.

4. Do the editing you wish in SilverFast HDR (tools as in SF8).

5. Click **Process**. You will see the progress of the scan as shown in the **Process Status** panel at the bottom of the dock (Figure 10E.8).

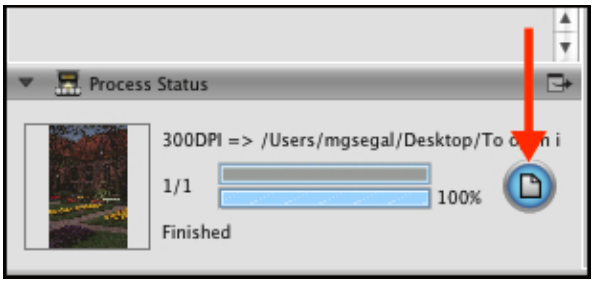


Figure 10E.8 Process Status Panel

6. When the process is completed (this happens very fast), click on the blue file icon at the right side of the progress bar (Figure 10E.8, red arrow). If you had previously associated the chosen file type (e.g. TIFF) with Photoshop in your computer operating system, the image will open in Photoshop for further work.

Only if you really want to know…….

I present some observations about the colour management of HDR images intended for eventual use in Lightroom or Photoshop.

A workflow from SF8 to SilverFast HDR to Photoshop is effectively a two-stage process from the perspective of colour management. We saw in Chapter Three that migrating from SF8 to SilverFast HDR, the only colour management that matters is that active in the HDR application; specifically, the scanner profile and the desired colour working space should both be enabled in SilverFast HDR **Preferences>CMS** to enable correct image editing in SilverFast HDR. Because it's fair to assume that the only reason for scanning to HDR is to use it for some image editing (while preserving an archive original scan), it's also fair to assume that we only need be concerned here with how colour management choices between SilverFast HDR and Photoshop cohere with each other. And to simplify it even further, only one such choice really matters, because we've also seen in Chapter Three that the only scanner profile it makes sense to use is the one purposed for your scanner; hence, the correct **Input** (scanner) profile should be active in SilverFast HDR.

You do, however, have a real choice of which colour working space to use (that is the **Internal** profile). You can choose between say sRGB, Adobe RGB(98) [ARGB(98)] and ProPhoto RGB. I recommended in Chapter Three that sRGB makes sense only if your images will be destined for nothing but web and devices forever after, while ARGB(98) and ProPhoto RGB make more sense for a print-oriented workflow, and if you are using a modern wide-gamut inkjet printer, using ProPhoto RGB and scanning in 48-bit mode makes the most sense.

In this context, if you set your default colour working space in Photoshop to say ProPhoto, and you've selected ProPhoto as the Internal profile in SilverFast HDR **Preferences>CMS** (with Colorsync or ICM active), once you **Process** the HDR scan and open it in Photoshop, this will be a seamless operation – the image will open in

Photoshop with no warning messages and it will look the same as it did upon leaving SilverFast HDR (where I adjusted luminance – red arrows):

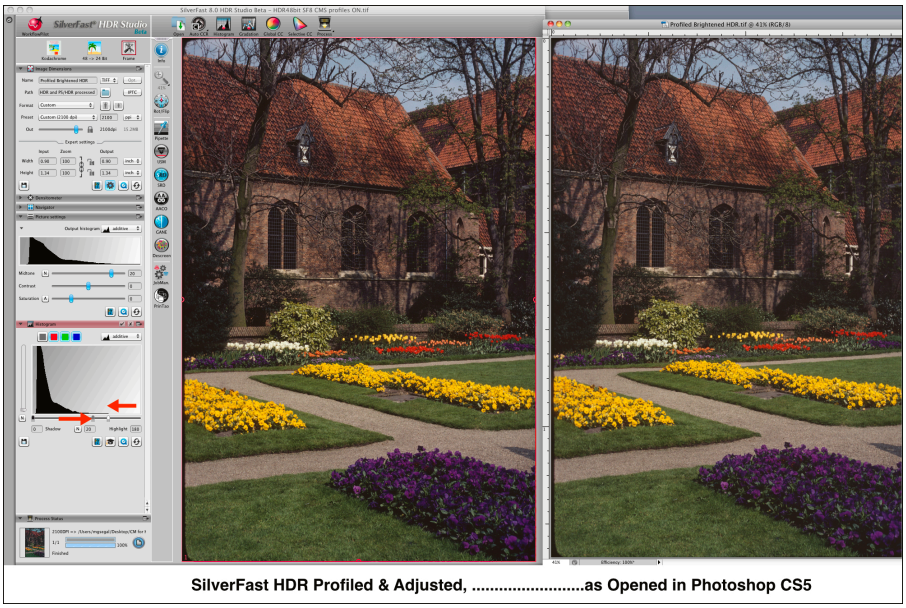


Figure 10E.9 HDR Image Profiled with ProPhoto RGB opened in Photoshop in ProPhoto RGB

Notice that the images look identical, indicating good, predictable colour managed image matching between the two applications.

However, if by any chance you have some **Internal** profile other than ProPhoto RGB embedded in the HDR image, once you process this image it will retain that profile – say it is ARGB(98). If you now open that processed image in Photoshop, you will get a profile mismatch warning of the kind shown below:

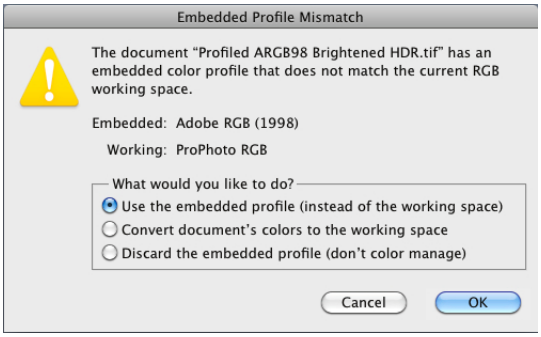

Embedded Profile Mismatch
The document "Profiled ARGB98 Brightened HDR.tif" has an embedded color profile that does not match the current RGB working space.
Embedded: Adobe RGB (1998)
Working: ProPhoto RGB
What would you like to do?
Use the embedded profile (instead of the working space)
Convert document's colors to the working space
Discard the embedded profile (don't color manage)
Cancel
OK

Figure 10E.10 Profile Mismatch Warning in Photoshop

Here you have two useful choices: either use the embedded profile (ARGB98 here), or convert the colours to the current Photoshop working space. I show the effect of both, first retaining the embedded profile (ARGB98):

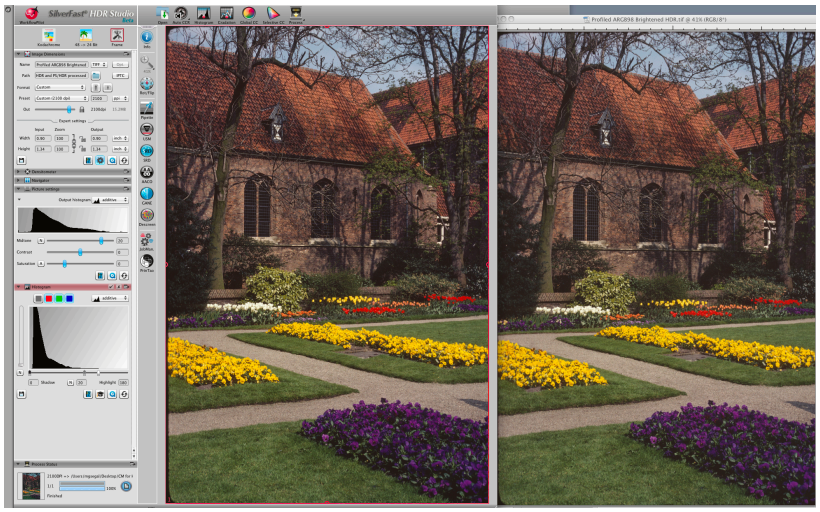


Figure 10E.11 HDR Image Profiled with ARGB(98) opened in Photoshop Preserving ARGB(98)

Here again, the result is a very reliable match between the SilverFast HDR version and the Photoshop version both based on ARGB(98) working space.

The second option, that of converting the image colours to the current ProPhoto working space is fine, because the conversion in Photoshop preserves the image appearance:

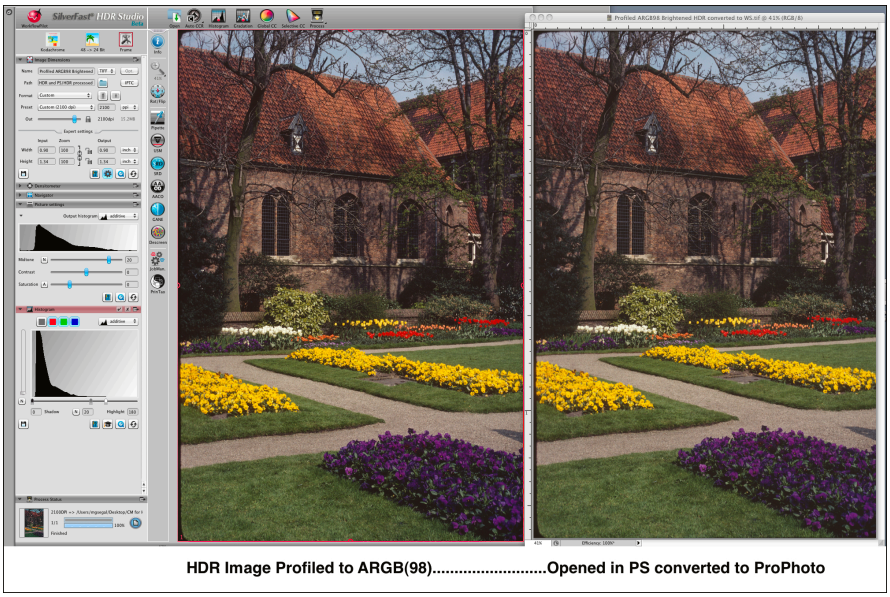


Figure 10E. 12 HDR Image Profiled with ARGB(98) opened in Photoshop Converted to Pro Photo RGB

Here too, the coloured managed outcome is predictable and correct. I generally recommend profiling both applications identically for the intended purpose of the image – it provides for a seamless workflow and works well.

Lightroom doesn't trouble the user with choices of working space until it comes time to deal with **File Settings** when exporting the edited image from Lightroom as

an edited file. Image appearance on importation, whether the ARGB(98) version or the ProPhoto version, looks very similar:

Figure 10E. 13 ProPhoto and ARGB(98) HDR Images Imported to Lightroom

Workflow (F) Hybrid Between SF8, Lightroom and Photoshop (no HDR)

Before making any adjustments, set **Preferences>CMS** (Figure 10F.1).

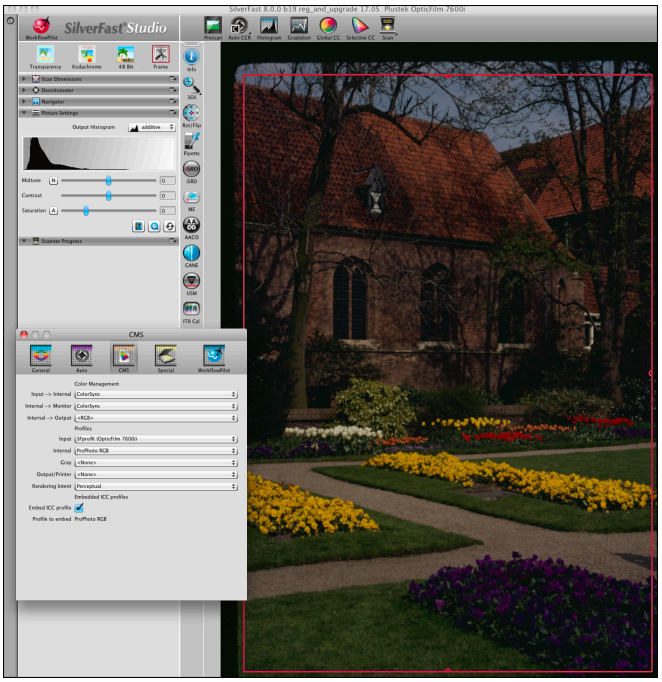


Figure 10F.1 Prescan before Adjustments in SF8 (CMS Settings Shown)

The prescan is dark (histogram well to the left). The obvious first steps are to normalize the histogram by remapping the white point to near white. This is achieved in the **Histogram** panel by shifting the highlight slider leftward (Figure 10F.2, red arrow) brightening the whole image and improving contrast. As it still wasn't bright enough, I next brightened the midtones by moving the midtone slider rightward as far as I could (figure 10F.2, blue arrow). Then, I opened the **Color Balance** panel and reduced the slight yellowish bias by shifting the black center-point very gently toward blue (Figure 10F.2, black arrow). Finally, I opened the **Gradation** panel and introduced a mild contrast boost, which strengthened the colour (Figure 10F.2, orange arrow). I destined the file to **Scan Watch** so that after scanning it would open in Lightroom's **Previous Import** space.

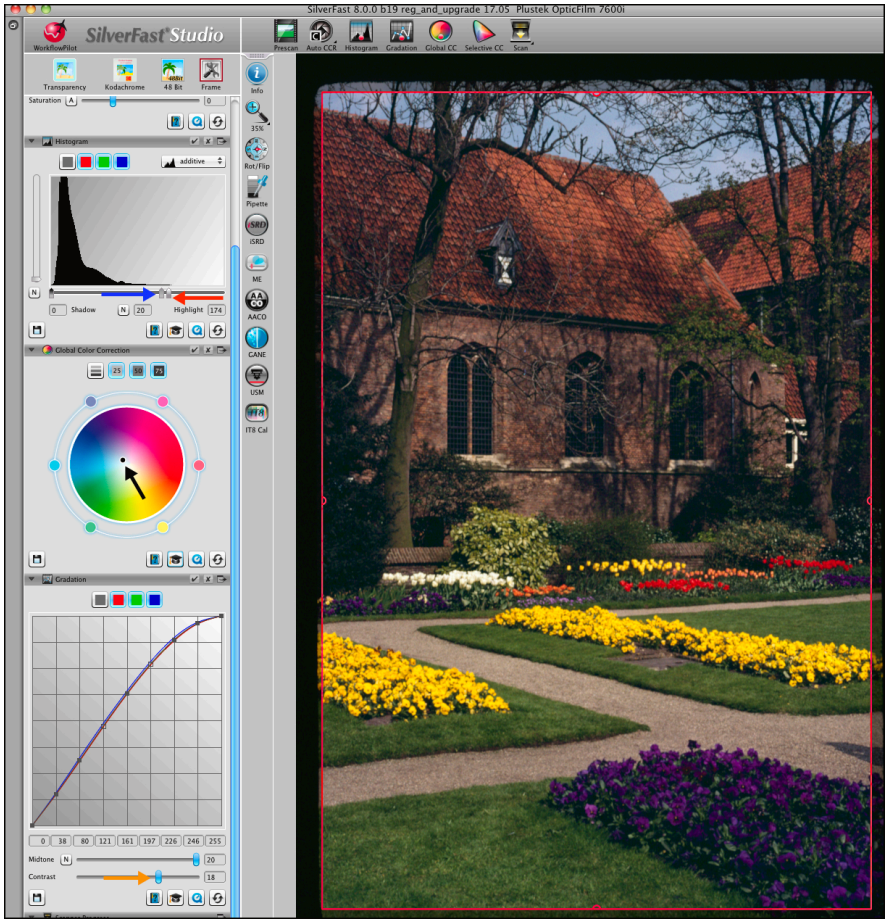


Figure 10F.2 Improved in SF8

The image opened in Lightroom 3.5 (Figure 10F.3), slightly brighter than in the exiting state from SF8. The Lightroom histogram shows slight highlight clipping, and there is scope to improve shadow detail in both the foreground purple flowers and the left-most pine tree by the building. I made several elementary edits in the **Basic** panel of the **Develop** Module (Figure 10F.4):

(i) I moved the **Recovery** slider rightward until the highlight end of the histogram was normalized (all tonal values within gamut). This is not an available adjustment in either SilverFast or Photoshop.
(ii) At the dark end, I increased both **Fill** and **Blacks** (in this case to values of 16 and 9 respectively), which produced the shadow detail of the purple flowers and the pine tree, while not destroying tone and colour anywhere else in the image.
(iii) I increased **Brightness** a bit to compensate the slight darkening effect of the highlight recovery process.
(iv) I capture-sharpened the image using the Lightroom **Scenic** preset.
Now completed in Lightroom (Figure 10F.4), I **Exported** the image to Photoshop for final steps and printing (Figure 10F.5).

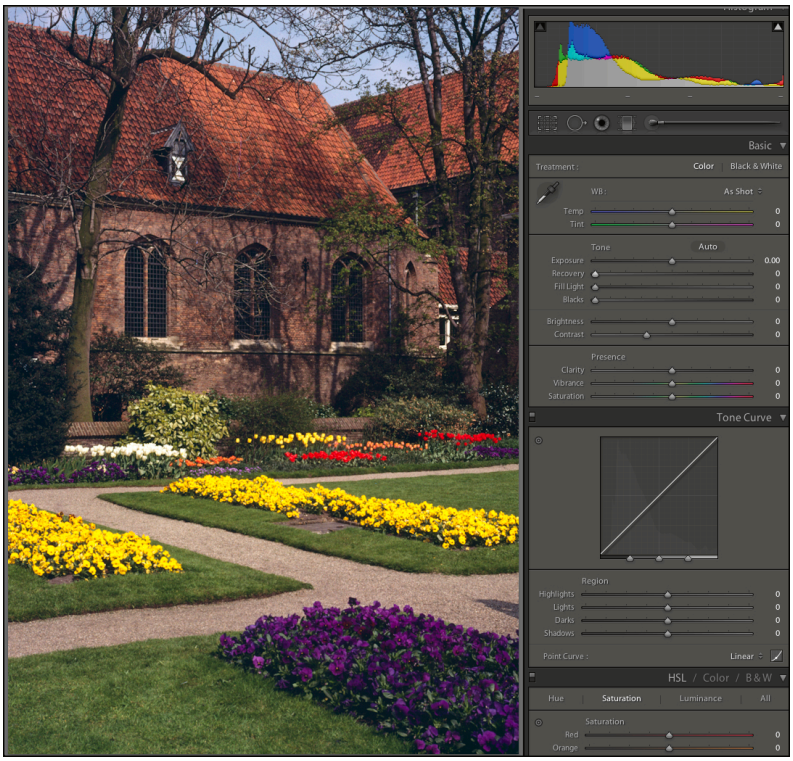


Figure 10F.3 Photo Opens in Lightroom

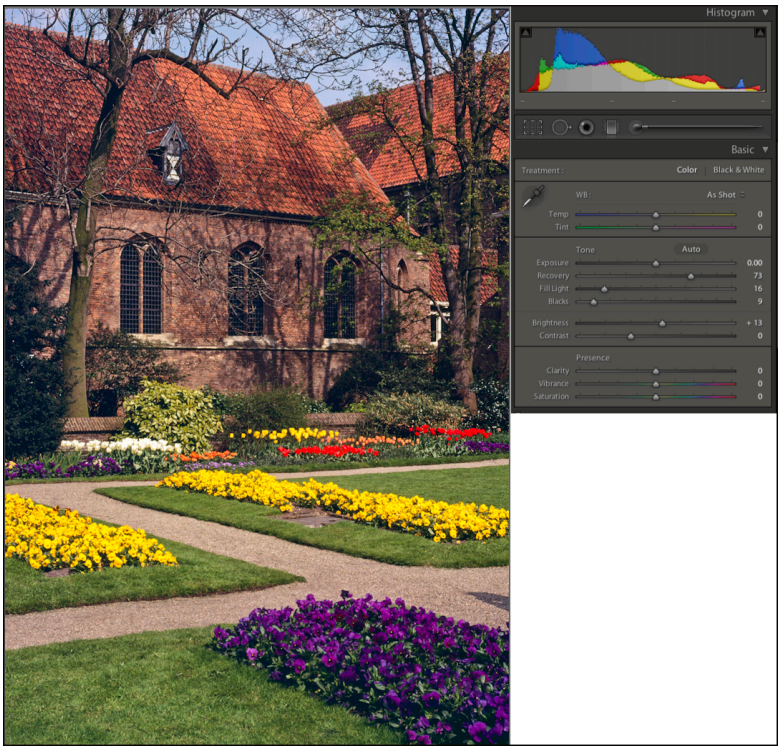


Figure 10F.4 Photo Edited in Lightroom

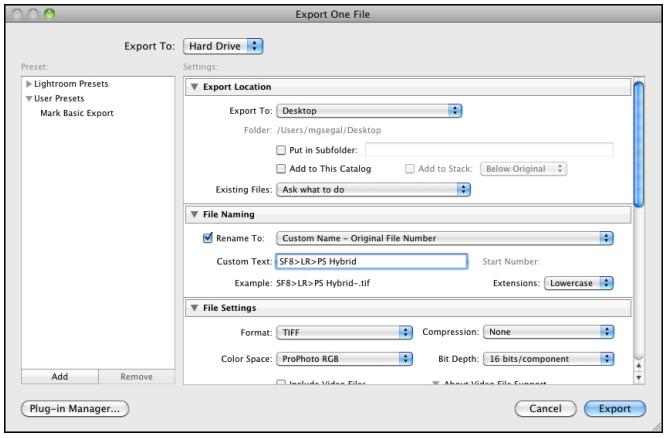


Figure 10F.5 Lightroom Export Dialog

This image is just about ready for printing and could have been printed directly from Lightroom's Print module. If you are using a version of Lightroom earlier than 4.0, however, export it to Photoshop, the reason being that it is not possible to soft-proof an image in Lightroom before Version 4.0- Process 2012; however, Lightroom 4 does have softproofing. Softproofing is the utility that allows you to predict on your monitor the effect of your printer/paper combination and make any necessary adjustments before printing. If you wish to soft-proof and you use an earlier version of Lightroom, the image must go to Photoshop; so once there, that is also a logical place for final Output Sharpening and printing. Under soft-proof, the image only needed a very modest contrast boost (Figure 10F.6)

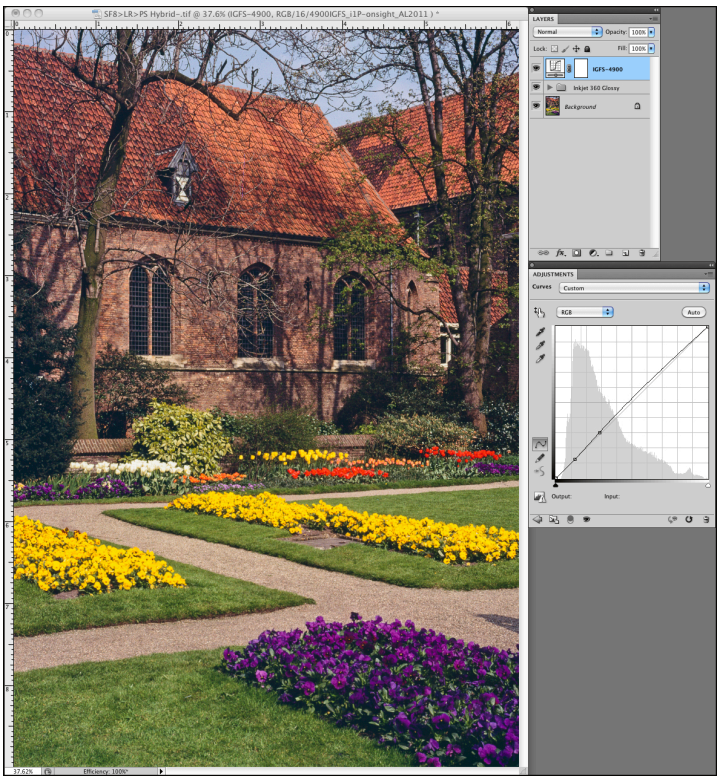


Figure 10F.6 Output Sharpen and Soft-Proof in Photoshop

There's one other "wrinkle" I didn't cover in the above sequence: grain mitigation. This image is useful for showing how a selective approach to grain mitigation can make sense. This is a Kodachrome. They tend to show little grain, so especially in a high frequency image like this one, it is almost non-apparent and therefore doesn't make sense risking image detail for grain mitigation – except in the sky. Even here it is subtle. Printed at 9*6 inches, it's invisible even in the sky, but in a much larger print it would show, especially after Output Sharpening, Selective grain mitigation is quite manageable in Photoshop, even with the sky interrupted by so many tree branches.

I clicked on the Background layer, then in **Select>Color Range**, targeted the sky with just enough Fuzziness to select it and nothing else, then pressed **CMD/CTRL J**, creating a layer with only the blue sky selected. With this layer active, I launched **Topaz Denoise** and mitigated the sky grain. It has no effect on anything else (Figure 10F.7, 200% magnification).

Figure 10F.7 Grain Mitigation in Sky

I've demonstrated in this series of adjustments the advantages of a hybrid workflow to optimize image quality:

- In SF8 I got the initial scan into a decent state at the scan stage, facilitating easy editing in external applications.

- I took advantage of Lightroom's unique capabilities to handle highlight and shadow recovery, as well as its good sharpening tool.

- I used Photoshop to do the soft-proofing and selective grain mitigation, as this is not available in the other two applications. While in Photoshop, I used PK Output Sharpener, customized for the resolution and paper type with which I print. Hence, between Lightroom and Photoshop I implemented the multi-stage sharpening workflow now recommended as "best practice".

A Summing-Up on Multi-Application Workflow Approaches

Inevitably, the question arises: if I have these options, what's best to do where between SilverFast HDR and Lightroom or Photoshop? This is partly a matter of taste, partly a matter of preference and partly technical fact.

I have done a fair bit of experimentation with various workflows and have some preferences, but caution that things keep changing, because the software keeps changing. Each application is upgraded on its own cycle, and the items that are improved differ between them at any time, so any views expressed here are necessarily temporary. One is always advised to experiment.

That said, at time of writing, my observations are the following:

- It's usually very useful to use SF8 with or without SilverFast HDR (depending on your preference for its archive features and self-contained workflow) to assure the highest scan quality of the desired resolution, and that the scan be

correctly profiled, before working on it in Lightroom or Photoshop. This gives added headroom for correcting and enhancing the image in those applications.

- Lightroom has particular strengths for achieving correct white balance, though SilverFast is very good here too, especially with the **Neutral Pipette**. Lightroom is also particularly, and in some ways – uniquely - effective with certain luminosity adjustments: recovery of partially absent highlight tonality, and treatment of shadow detail with a combination of Fill and Blacks in Process 2010, or Shadows and Blacks in Process 2012.

- Lightroom has unique capabilities to create imaginative grayscale images with toning and split-toning, not usually found outside of specialized software for B&W conversions.

- Lightroom can perform certain functions beyond the scope of scanning software, such as very basic transforms (e.g. keystone correction), creation of web galleries, slide shows, printing and in Lightroom 4 – preparation of photo books for printing at "Blurb".

- Beyond Lightroom, Photoshop and its myriad of plug-ins are available for whatever else one needs. On a routine basis, the use of a bespoke noise mitigation program and Photokit Sharpener are particularly advantageous for dealing with film scans.

- Photoshop remains the preferred application for edits that require especially strong capabilities in layering, masking and transforms.

- But one always needs to bear in mind that we are dealing with scanned media here, and good quality processing in any external application will always deliver better results the better the initial scan, so using SilverFast to advantage is the essential foundation of a good scanning workflow.

Chapter Eleven

Batch Scanning

Batch scanning is available for flatbed scanners having a frame-holder for a number of positives or negatives, the Epson V750 Pro I work with here being one example amongst many others, and certain film scanners with automated media feeders. The convenience provided by batch scanning is that you can edit a frame-holder full of images, each with its own customized treatment, click **BatchScan** and go for coffee while the scanning of all selected photos happens automatically, without interruption or supervision.

The **step-by-step** for doing this follows. I'll show two approaches:

(1) Each frame is prepared with some settings in common, some individual and than all of them are batch-scanned.

(2) Several images in a holder are prepared with one group of settings, and another number of images are prepared with another group of settings and then the two sets batch scanned. This one uses the **Job Manager**.

(1) Individual Frames with Some Common Settings

When I open SilverFast with my Epson Perfection V750Pro turned on and a frame of say six slides loaded in the holder, I click **Prescan** and the frame-holder of images is prescanned into the preview window with the red frame, which may look like what you see in Figure 11.1.

Figure 11.1 Prescanned Images for Batch Scanning

SF8 must find the frames for the individual images. I do this in **Frame** Menu by Clicking on **Frame** (Figure 11.2, red arrow), scrolling to **Find Frames** and then scrolling to **Slide 35mm holder** (because that is what needs to be detected in this case – there are options listed for other kinds of holders; select the correct one).

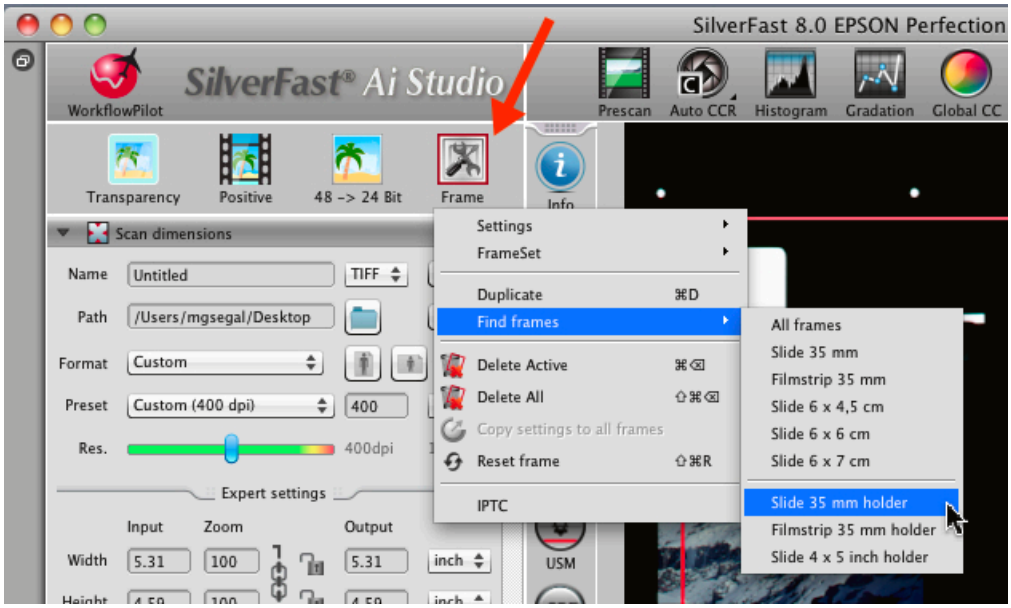


Figure 11.2 Find Frames Command

The result of this command shows each image selected with its own frame, the active frame being in red, the others white (Figure 11.3). The default position of the red frame is last image detected.

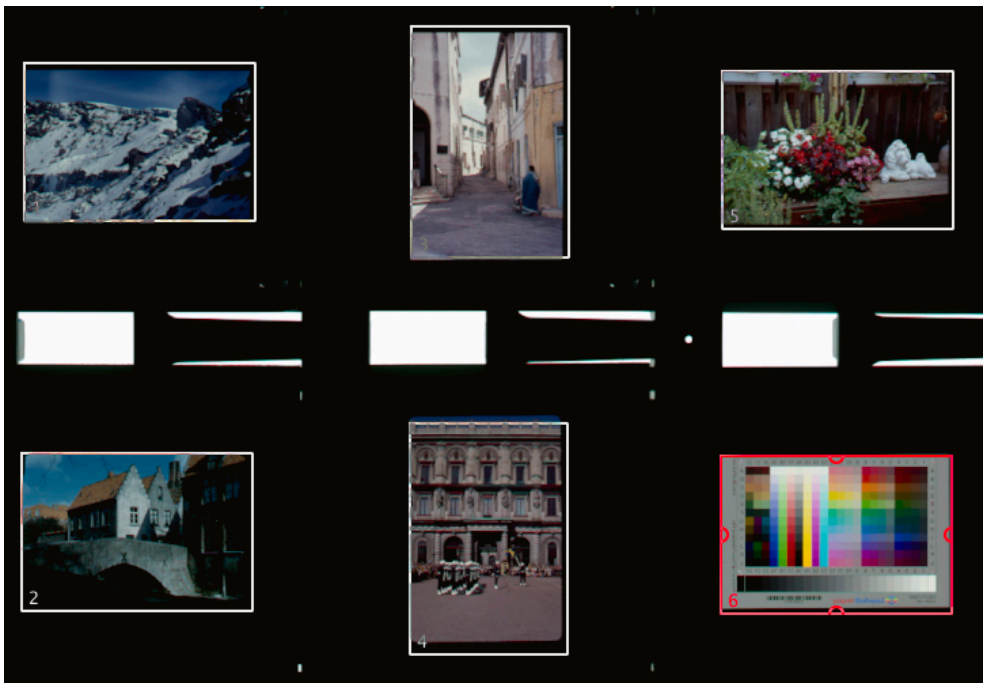


Figure 11.3. Frames Found

Now, there is a division of labour into two stages, in order to smooth the process of batch scanning. The first stage is done to copy all the settings that these images will share in common. The second stage will be to customize each image's other settings that will not be shared in common (e.g. brightness, colour balance).

First stage: select the image (by clicking on it to make it the active frame) and make all the settings for that one image that you wish to be conveyed to all the other images. Let us assume that the only settings to be held in common are in the selection of bit-depth (Figure 11.4, red arrow) and in the **Scan Dimensions** panel, because you want the file format, image naming sequence, the file location path, the scan resolution and the image dimensions to be the same for all the images being scanned in the batch. So I've set those up in the Scan Dimensions panel (Figure 11.4). Once you name that first image, SF8 will automatically retain the same alphabetic name, but sequentially number the frames as they get scanned, so that each image will have its own file name/number.

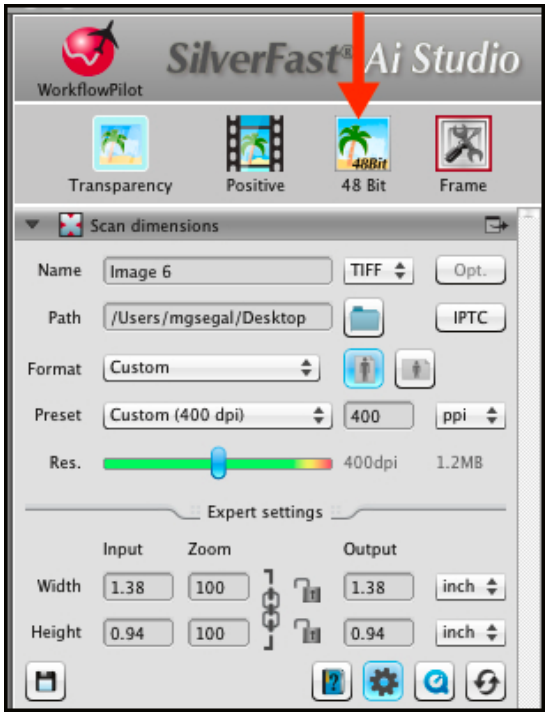


Figure 11.4 Settings in Common

To copy these settings to the other images in the frame, click on **Frame** and select **Copy Settings to All Frames** in the drop-down menu – by clicking on it (Figure 11.5, red arrow and blue highlighting). Nothing shows, but these settings are all saved to all those images. (To erase all the settings, you can go into **Frame** and click on **Delete All**, or to delete the current selection, click on **Delete Active**.

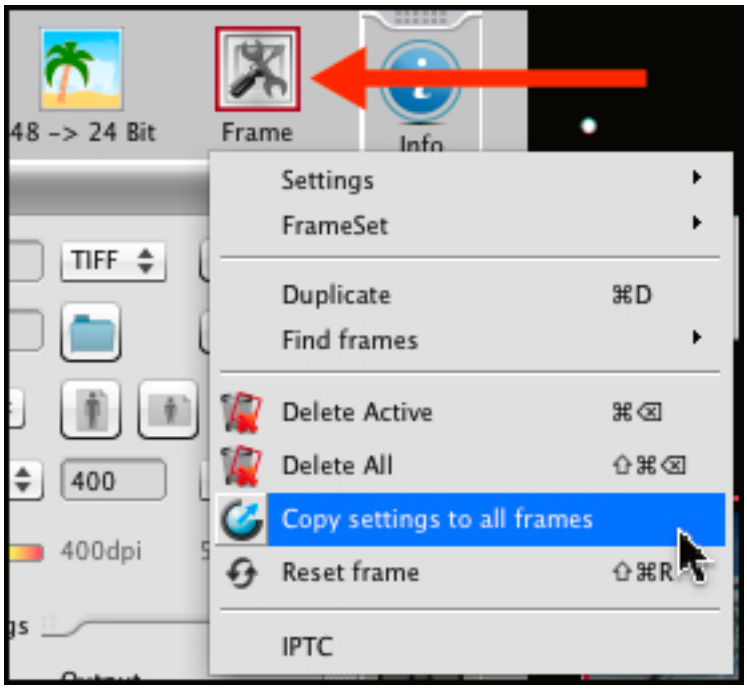


Figure 11.5 Copy Settings to All Frames

Second stage: make the individual edits you wish to make for each frame. Do the editing as you normally would, explained in the previous chapters. Click on an image to activate it and make your edits. When you magnify the image to fill the preview window, this is also the time to adjust the red frame to more exactly fit around the image than **Find Frames** may have done automatically. Just for sake of illustration, I'll give each one of them a different extreme colour cast (Figure 11.6). To do this I activate an image, select **Global CC**, create the cast and repeat for each image.

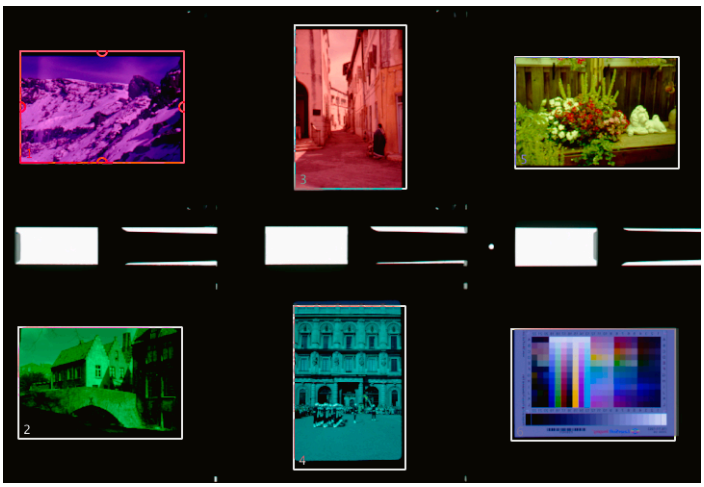


Figure 11.6 Individual Image Edits

I'm now ready to scan. I click and hold the **Scan** button until I see the drop-down menu giving me the option to **Scan** or **Batch Scan**. I select **Batch Scan** (Figure 11.7).

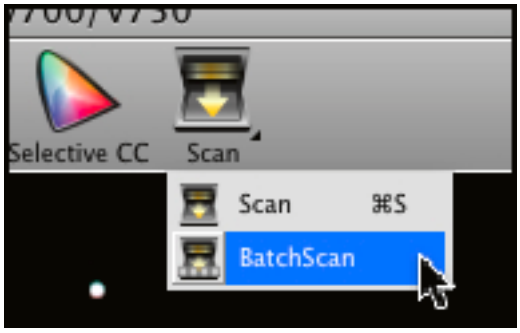


Figure 11.7 Batch Scan Selected

Having done that, the scanner will dutifully scan each image as instructed while I go have a coffee. But just in case you want to sit there watching, the current image being scanned shows in **Scanner Status** panel at the bottom of the Dock (Figure 11.8).

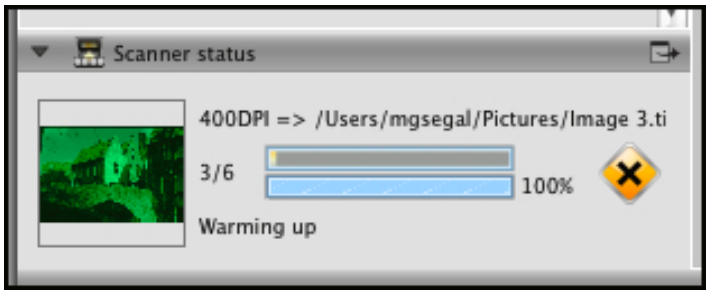


Figure 11.8 Scanner Status

You may cancel the scan by clicking on the yellow diamond with the **X**. As I've scanned these images to my Desktop, here is where I find them (Figure 11.9)

Figure 11.9 The Scanned Images

(2) Use the Job Manager for Batch Scanning Several Sets at Once

I've gone to **Frame>Delete All**, to erase all the settings I made for the exercise above, and I shall start over, implementing the **First Stage** as described above, but

then doing the remainder in **Job Manager**. This allows me to customize settings to selected groups of images.

To recap the common settings, do everything as above up to and including Figure 11.5.

Then, open Job Manager (Figure 11.10, highlighted in the red box by the red arrow). You will find all the images present with thumbnails, resolution and file size.

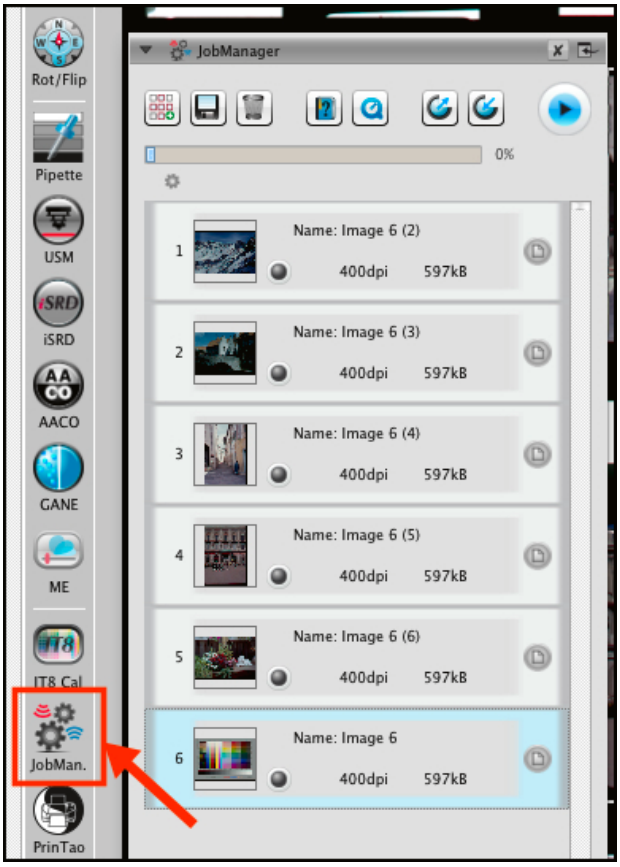


Figure 11.10 Job Manager Opened

Starting with the active image in frame 6 (called Image 6), I shall give the lower right cluster of three (in Figure 11.3) a magenta cast and the upper left cluster of three a green cast, for illustrative purposes.

To do this, I begin with the active frame (the one in the Job Manager at the bottom with the blue surround, indicating it is the active frame), select **Global CC**, introduce the magenta cast (Figure 11.11 black arrow), and click on the **Copy Settings** button (red arrow, centre panel). Upon doing that, a dialog opens asking to **Select the parameters to copy** (Figure 11.11, right side). I select all of them (because I want all of them copied – otherwise I would only select the ones I want copied) and click **OK** (blue arrow).

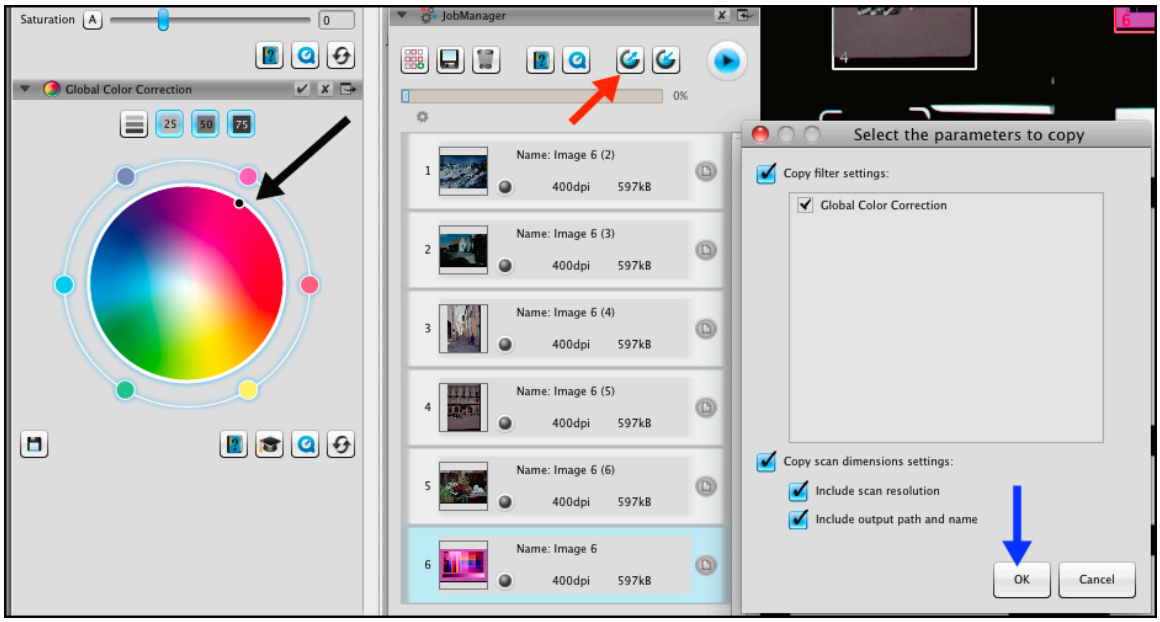


Figure 11.11 Copy Settings

Then, I select the other images within the **Job Manager** to which I wish to copy these settings by doing a **SHIFT-CLICK** on each one, whereupon they will have blue surrounds. Then I click on the **Paste Settings** button (Figure 11.12, red arrow) and the selected images will adopt the cast of the first image from which the settings were copied.

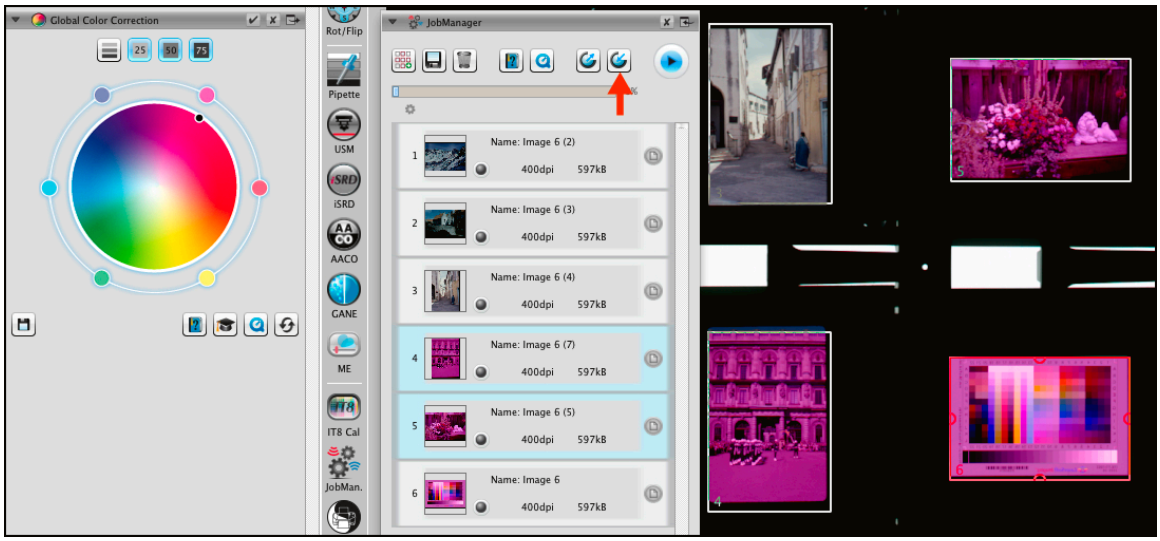


Figure 11.12 Paste Settings for Magenta Group

Next, I have the remaining three images to adjust. I repeat exactly the same process as above, firstly by clicking in the upper left image to make it the active frame. Then I introduce a green cast, click **Copy Settings**, the **copy settings** dialog opens, I select all the settings I wish to have copied, then Click **OK**. Then I select the other two frames to which I want these settings pasted, and click on the **Paste Settings** button.

These three images all now have a nice green cast (Figure 11.13). At this point, I click the **Scan** button (Figure 11.13, red arrow) and the **Job Manager** scans the six images in a batch, as set-up.

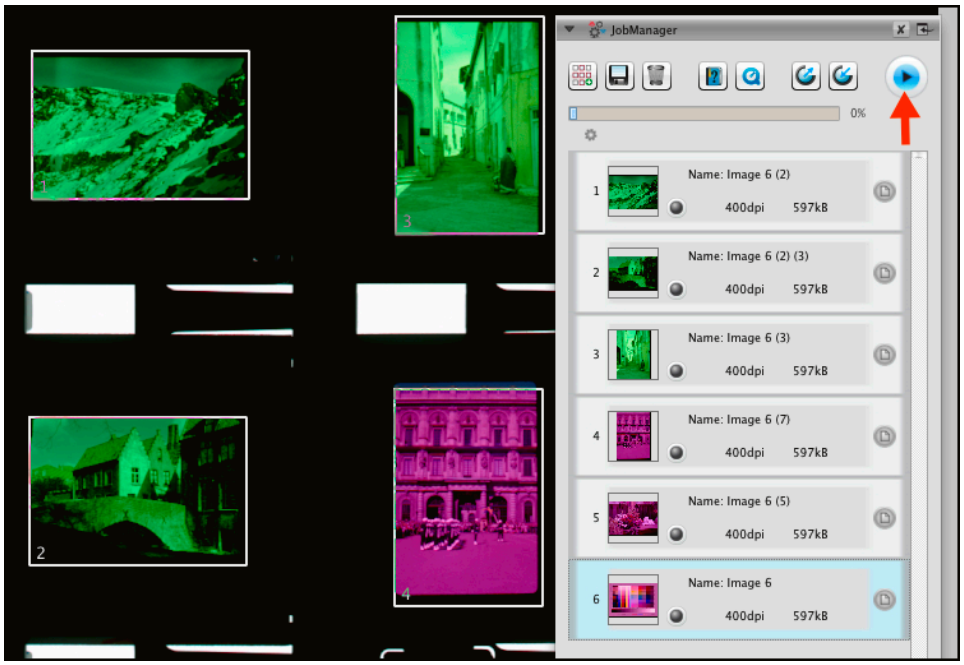


Figure 11.13 Green Group Pasted and Click Scan

My two sets of images scanned in one batch appear on the Desktop where I had arranged for them to be sent (Figure 11.14).

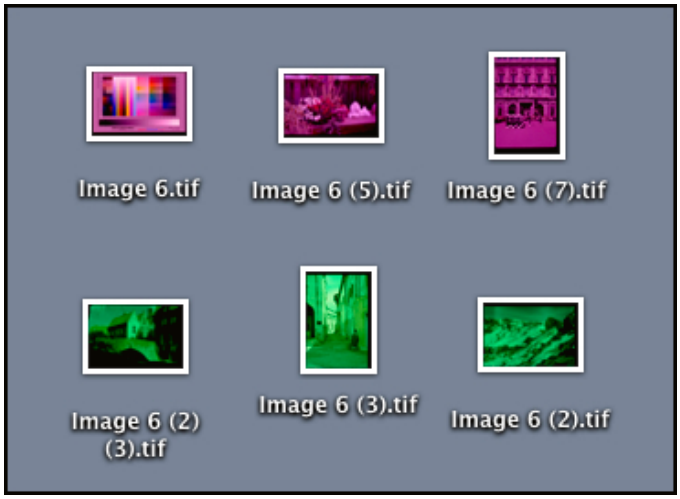


Figure 11.14 Two Groups Scanned in One Batch

Appendix 1

Colour and Colour Management Basics

The material in this appendix consists of pages extracted from Mark Segal's Basics Course in digital imaging, given at the Luminous-Landscape Gallery. The course did not cover scanning; but the content is relevant to scanning. In the colour management section, the device being colour-managed could as well be a scanner, as a display or a printer – the basic principles are the same.

2. Colour:

We could spend a life-time on this, but we won't.

The "Bible" on colour management is "Real World Color Management" By Bruce Fraser, Chris Murphy and Fred Bunting, 2nd Edition, Peachpit Press, Berkeley, CA. 2005. (RWCM) Chapters 1 and 2 are colour basics for everyone, but gets into colour management (more advanced) thereafter.

They describe seeing colour as "an event" depending on a light source, an object and an observer. It is "a sensation evoked in the observer by wavelengths of light produced by the light source and modified by the object".

Light travels in long, medium and short wavelengths which our eyes perceive in turn as red, green and blue colour.

Light travels into the surface of objects, absorbing some wavelengths and reflecting others; the make-up of the in-going light differs from that reflected and which we see.

"...the fundamental basis for *all* color reproduction is the three channel design of the human retina." (RWCM, pg 16) These "channels" are the retina's cone receptors sensitive to red, green or blue wavelengths, making possible these three *additive primary colours* (the RGB model), allowing us to simulate colours by using varying amounts of red, green and blue light. If RED, GREEN and BLUE light are added in equal proportion the result is white or gray.

But what happens when they are subtracted from white? We get the "*subtractive primary colours*", or CMYK model.

CYAN emerges when RED is subtracted from white.
(I.E. CYAN is a combination of remaining GREEN and BLUE.)

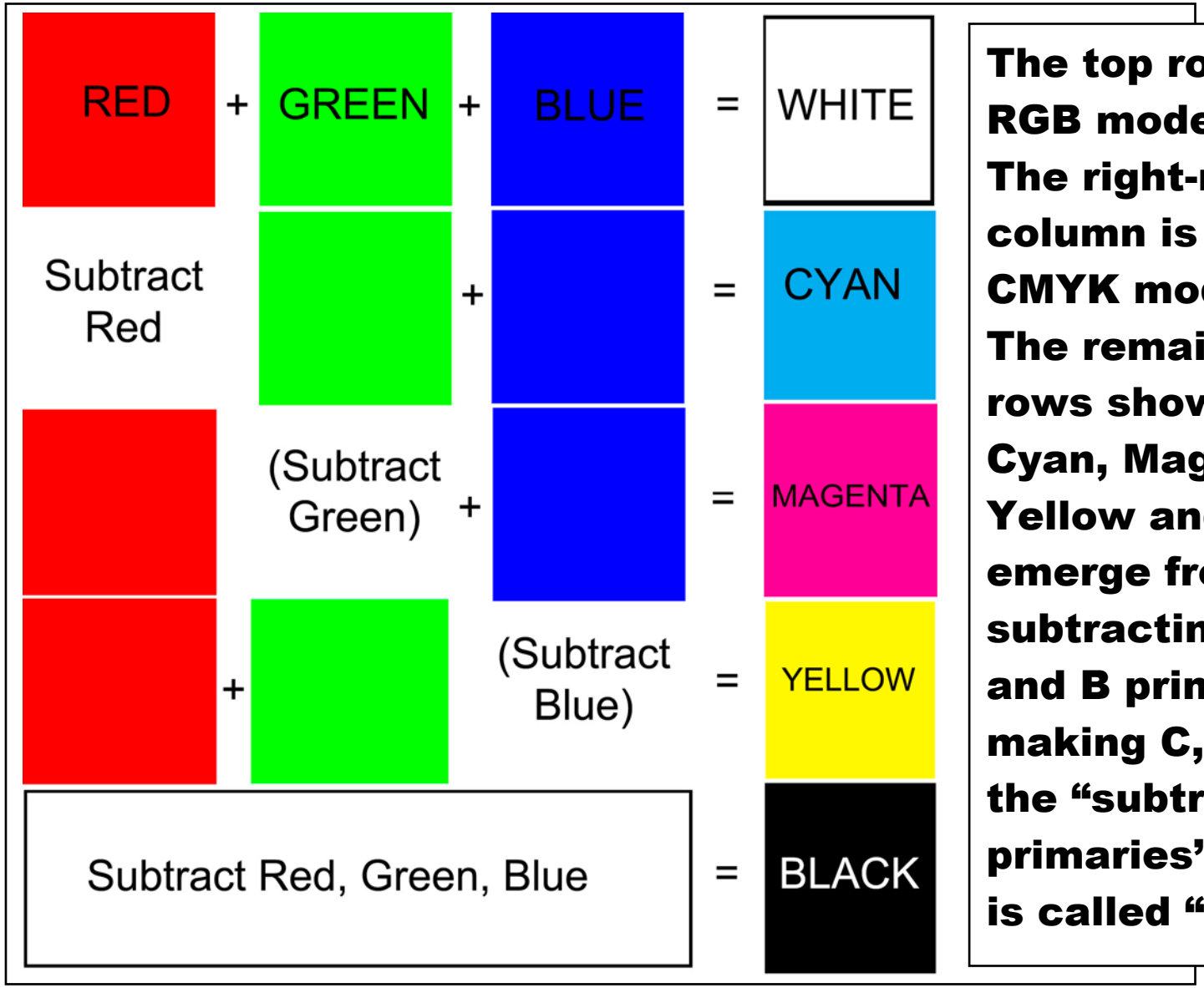
MAGENTA emerges when GREEN is subtracted from white.
(I.E. MAGENTA is a combination of remaining BLUE and RED.)

YELLOW emerges when BLUE is subtracted from white.
(I.E. YELLOW is a combination of remaining GREEN and RED.)

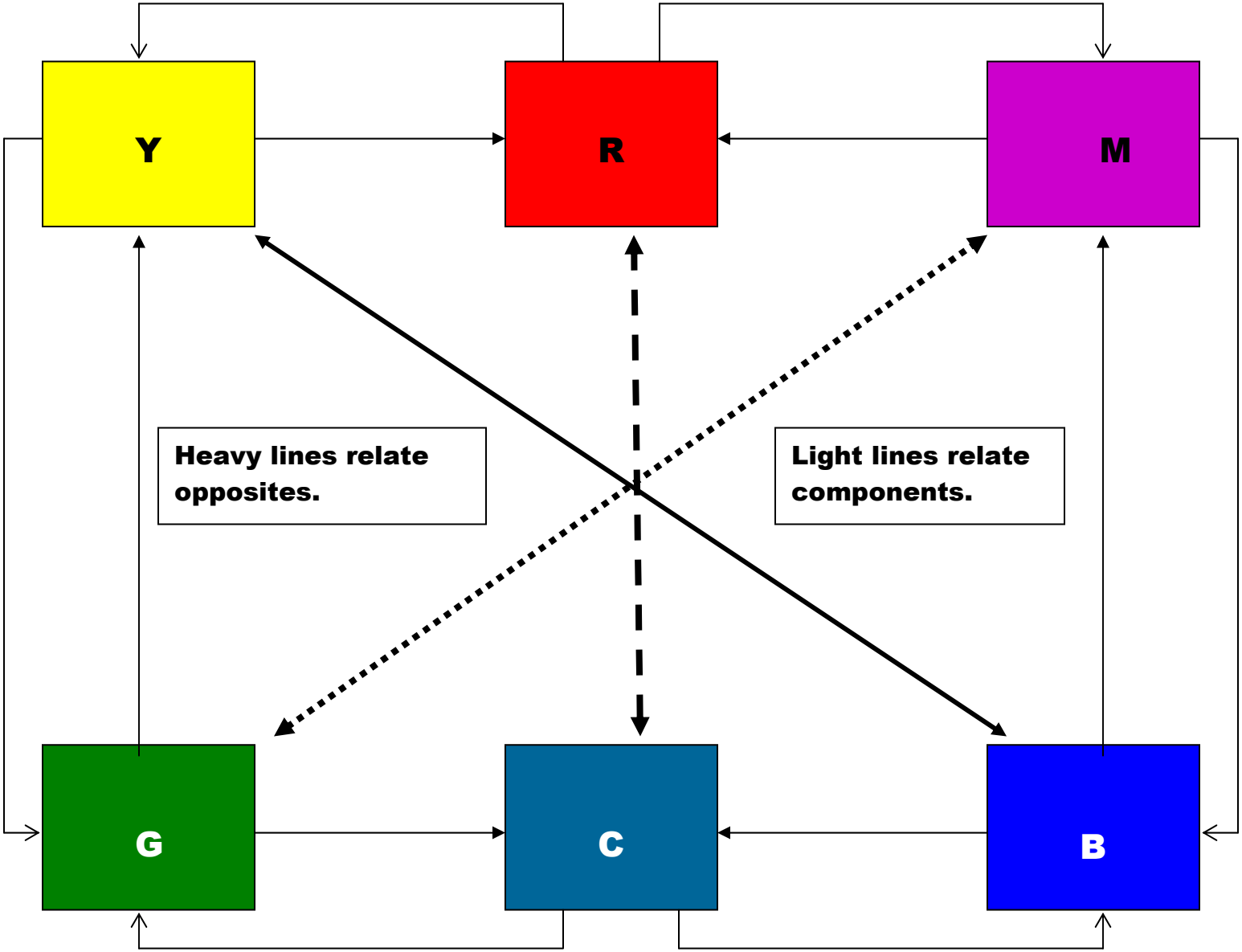
For printing, BLACK (K) is included [because C+Y+M does not yield pure enough Black], completing the CMYK model.

Our displays transmit R, G, and B light, while our printers use mainly CMYK inks; but some models also include RGB primaries.

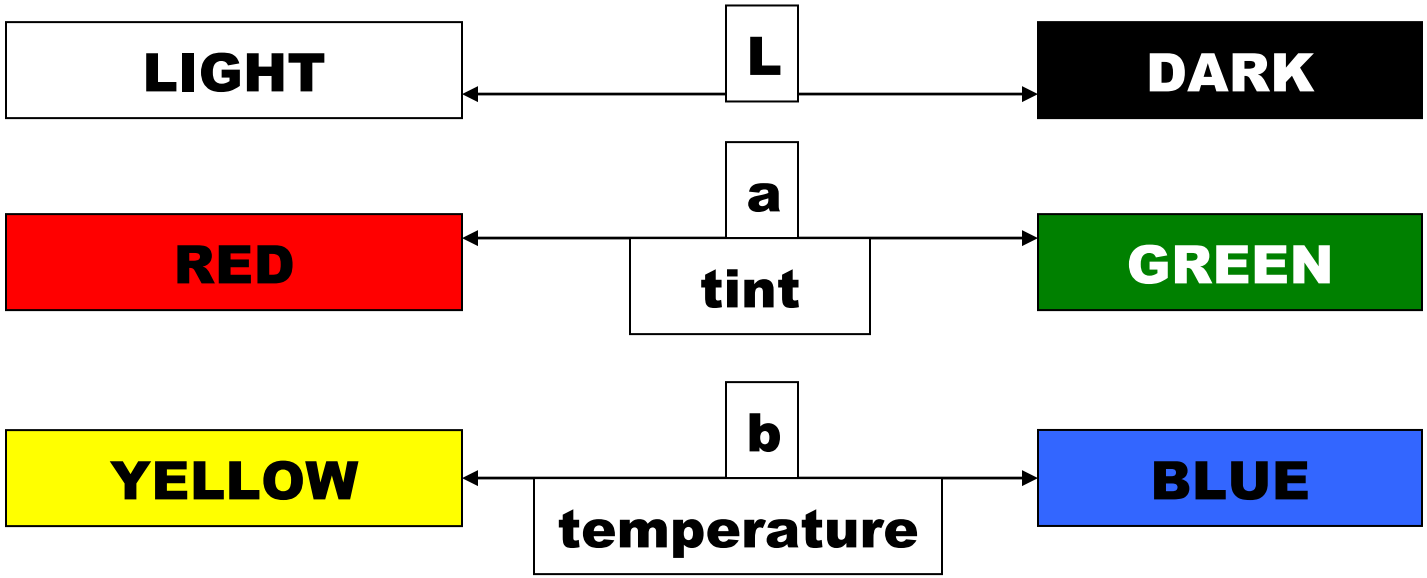
These relationships, illustrated on the next 2 pages, permeate all colour corrections we implement when editing a digital image; hence good to remember them.



The top row is the RGB model. The right-most column is the CMYK model. The remaining rows show how Cyan, Magenta, Yellow and Black emerge from subtracting R, G and B primaries, making C, M and Y the "subtractive primaries". Black is called "K".


Y
R
M
Heavy lines relate opposites.
Light lines relate components.
G
C
B

The colour components of the human retina also work as *opponent pairs*:



This characteristic of vision informs the L*a*b* colour model, where luminosity [L] is separated from colour. [But in the L*a*b* model, the "a" axis opposes Magenta (not Red) to Green.]
The distinction between Luminosity and Colour comes up in a number of image adjustment contexts, so useful to remember.

The L*a*b model:

When "a" and "b" = 0, the tone is neither G nor M, nor B nor Y: it is gray. Photoshop's L*a*b readout is very convenient for finding "neutral" (absolute gray) pixels in an image. "a" values below 0 tend to G and above 0 tend to M. "b" values below 0 tend to B and above 0 tend to Y.

How we use these colour models:

RGB – image editing on our displays; data sent to printer.

CMYK – mainly for printing files converted from RGB.

L*a*b* – colour management (under the hood); reading luminosity and colour balance information; almost never for editing (we can stay in RGB and still get at Luminosity when and where we need it).

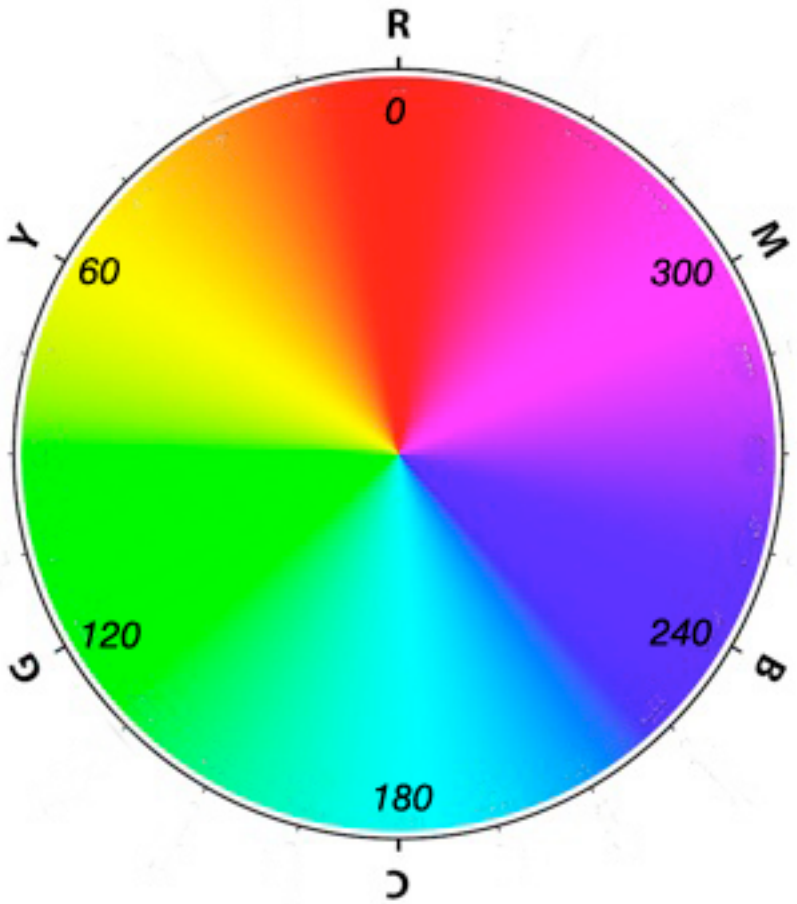
Next, the HSB model; it separates colour into components of HUE, SATURATION and BRIGHTNESS, all of which we can adjust in our image editing programs. So let's see what H, S & B are (as defined in the RWCM Glossary) and a bit about what they do.

HUE: "The property of light from a surface or light source by which we perceive its dominant wavelength" (colour).

SATURATION: "The property of light from a surface or light source by which we perceive the purity of the light – how much does the light contain photons of only a certain wavelength (highly saturated) or a mixture of many wavelengths (less saturated)." (As a colour regresses from intense to gray, it is being desaturated and vice-versa.)

BRIGHTNESS: "The perceived response to light intensity". (I.O.W., how "bright" the colour looks.)

I'll discuss the use of the colour models more fully when we use them for working on images.



Hues are measured as degrees of a 360° circle, starting with RED at 0° and increasing counter-clockwise through Y, G, C, B, M, back to R.

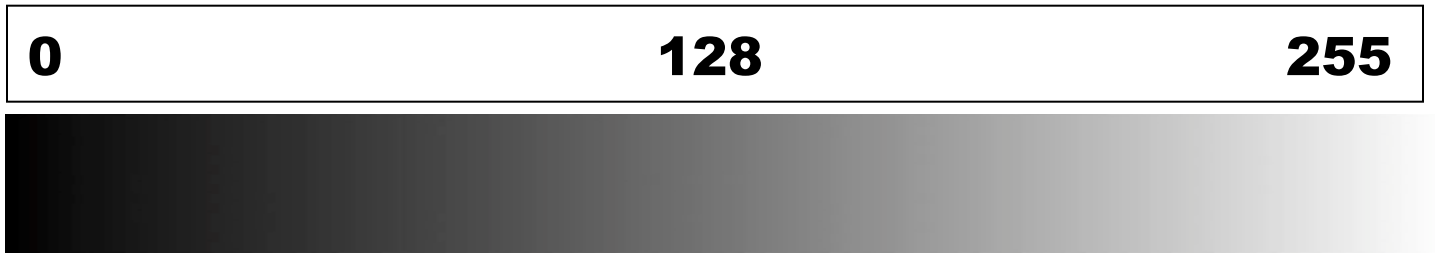
SATURATION:

It is measured on a scale of 0 to 100, or in Adobe Lightroom: +100 to -100, where 0 is "normal".

(This is real easy to do, by the way. I'll show you later.)

BRIGHTNESS:

We've seen it already for grayscale, where the scale corresponds with the brightness levels in an 8-bit image mode:



Here's a demo of brightness for colour:

The Brightness scale is shown in %, but the levels metric (0 to 255) is used for identifying the luminosity levels of each colour channel.

So, how many colours can our images contain?

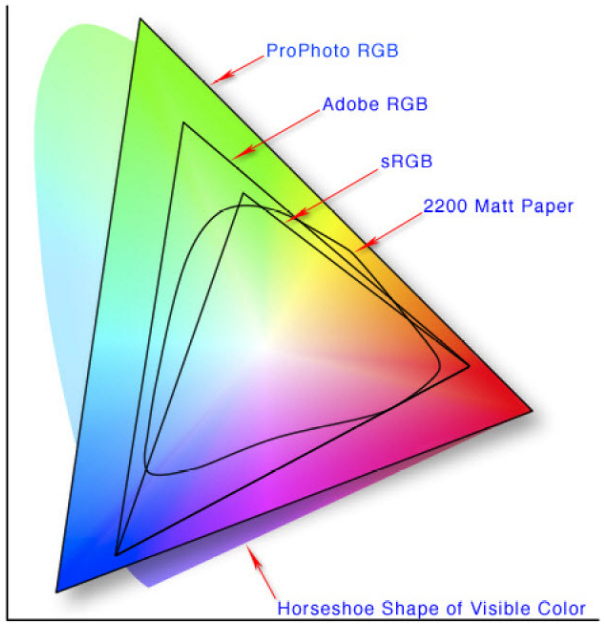
In an 8-bit RGB image, which has three channels (R, G & B), there can be: 256^3 colours, i.e. 256 * 256 * 256 = about 16.8 millions (often referred to as "millions of colours").

That's a lot of colours, but pales by comparison with a 16-bit image, where there can be 2^16^3 = 281 trillions.

(In Photoshop, the implementation of 16-bit is really 15-bit +1, so maximum colours are 2^15^3, or about 35 trillions.)

Images need to be contained in a "*colour space*" which bounds and scales the gamut of colours to be included. Gamut is the range of colours reproducible from a device such as a monitor or a printer.

You should know which colour space to use and why, because it can affect image quality.

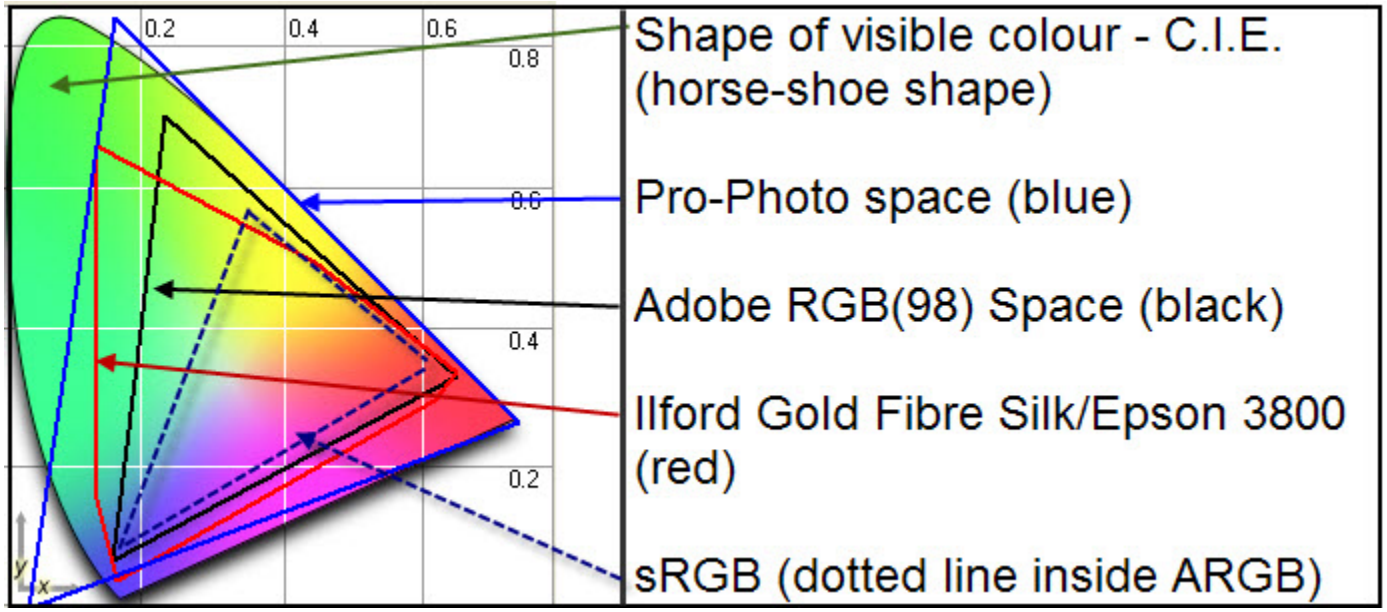


The horseshoe is the limit of human vision determined by the CIE in 1931 in L*a*b* space. The three spaces of most interest to photographers are ProPhoto, Adobe RGB, and sRGB, in decreasing order of size.

(Diagram from "A Color-Managed Raw Workflow", Adobe White Paper by Jeff Schewe and Bruce Fraser.)

sRGB is useful for internet – display, email, etc.
Newer inkjet printers and papers reproduce colours which exceed Adobe RGB, so many photographers use ProPhoto.

Colour spaces and print gamut:

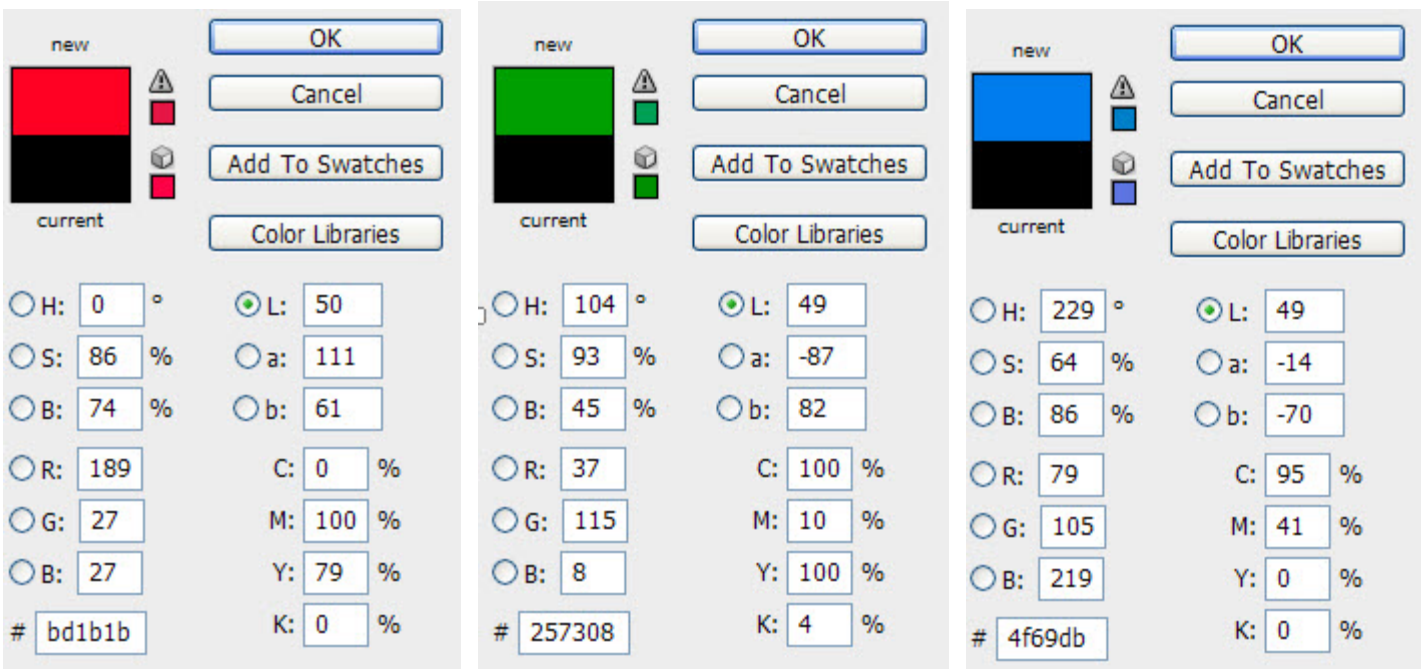


ProPhoto comes closest to replicating visible colour.

The shown paper/printer gamut exceeds Adobe RGB(98); hence it needs a ProPhoto colour working space to use its full gamut.

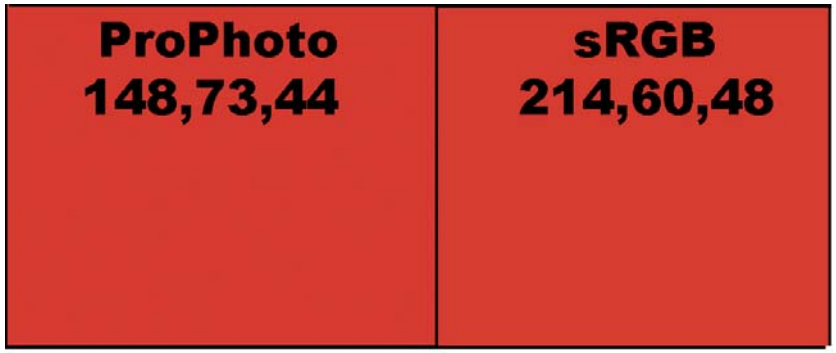
sRGB has a severely limited gamut relative to current print technology, but still fits most (not all) display capabilities.

Get a feel for the different colour numbering systems:



Intentionally, I didn't make any of these R, G and B colours to be "pure", so you could see how component colours are defined by the numbers in the four colour spaces. These images are screen-grabs of Photoshop's "Color Picker" tool.

RGB numbers differ between RGB spaces for the same colour, because the measurement scale is the same 0-255 per channel, but it fills different sizes of RGB colour spaces:



Both are L*a*b* 50,60,44

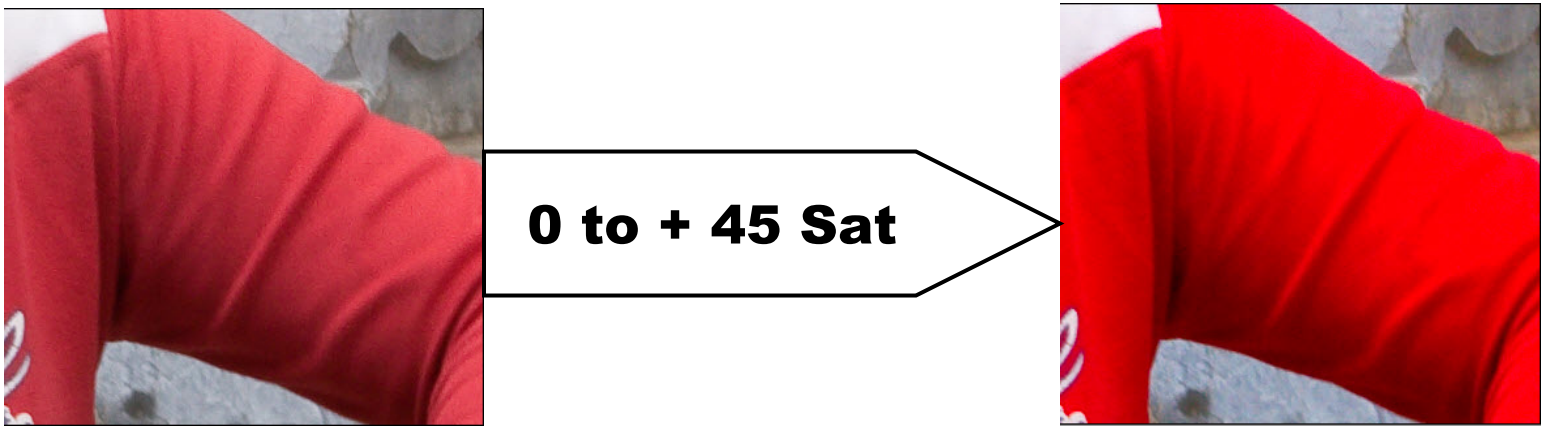
L*a*b* is unambiguous: each colour has a unique numerical value in L*a*b, but a change of scale changes RGB values.

In the figure the colour is identical in both RGB spaces, but the RGB numbers differ – e.g. Red: it's much closer to the sRGB boundary, so a higher number than the same tone in ProPhoto.

Co-ordinate Your Choice of Bit-depth and Colour Space:

You should use 16-bit depth with ProPhoto Colour Space.

Because the colour space is so large, 8-bit data may be spread-out to an extent that banding, posterization and unintended saturation effects could occur. High saturation can also smother image detail by compressing Levels of tonality in the more saturated areas of the image.



How white are your whites?

No...not about laundry soap!

The colour temperature of daylight, measured in degrees Kelvin (°K), changes from yellowish (early morning ~ 3400K) to bluish (mid-day 5500K~7000K) to yellowish (evening).

Halogen bulbs are about 3400K. "D50" Solux bulbs (called "daylight" bulbs), recommended for our digital studios, are 4700K or 5000K. (See diagram overleaf for further information on the colours of different light sources.)

Inkjet papers vary in whiteness from being slightly warm (yellowish) to slightly cool (bluish), but look at any one of them in isolation and they "seem white". Which to use depends on your taste about what tone suits the image.

White-point and White Balance:

Our eyes/brain adapt to various "shades of white", so seen alone each looks "white". Devices aren't quite so clever.

Camera white-point: For non-raw file formats we tell it the kind of light in which we are photographing.

Display white-point: We select a colour temperature for monitor white – usually 5000K, 5500K, or 6500K. (More later on which to use.)

White Balance: Finding a neutral tone in a photo from which to key/tune the full colour palette. (More later on techniques and issues.)

6. Colour Management

Like colour – a very deep subject on which we could spend a lifetime, but we won't. This section covers only what you absolutely need to know for inkjet printing and web photos.

Why Colour Management? This is mainly about two things: (i) Predictability ("roughly" WYSIWYG but not quite), and (ii) Perceived colour consistency across devices.

Within the same family of devices, colour rendering can differ (e.g. colours of the same image can differ between two displays, absent management). Between different devices and colour spaces (e.g. from monitor to printer) gamuts and Dmax differ, but we want consistent colour.

The file I prepare on my computer using my display and printer, should look the same printed from any other computer and printer, even though the displays and printers without adjustments will most likely render the same colours differently. My web pictures should look as similar as possible on all displays even though the displays differ, because I can only adjust them "properly" on my display.

Colour management aims to achieve these objectives, and these days it is largely successful, thanks to the efforts of a great many scientists, engineers and programmers in many companies, coordinated to varying degrees under the umbrella of the ICC (International Color Consortium).

The overall strategy of colour management is firstly to have an "anchor" of reference colour values (independent of devices) for describing the behaviour of each device (this anchor being the CIE L*a*b* [or "XYZ"] colour space), and secondly to have a mechanism allowing for the translation from what the device shows to what it should show based on the file numbers. This mechanism has four main components:

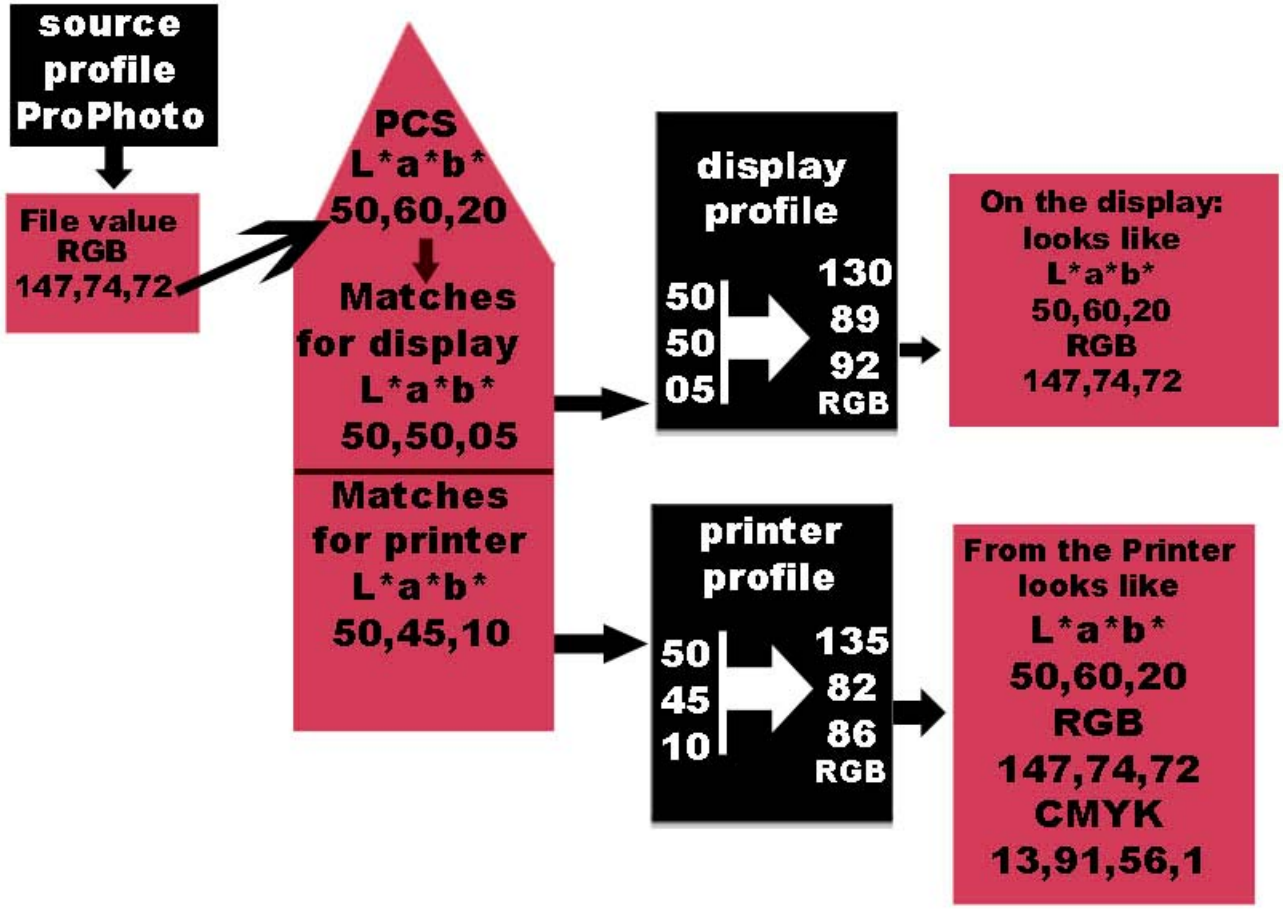
- **ICC profiles (which describe device colour rendering),**
- **Profile Connection Space (PCS), the hub of colour management for transferring colour data between devices to get consistent results; sits in the CMM:**
- **Colour Management Module (CMM), which does the math, and**
- **Rendering Intent (RI), which determines how to handle "out-of-gamut" colours (OOG colour – colours which are included in the source space but not in the destination space.**

We'll look at profiles, PCS and RI now.

A language analogy: the reference values are in English where "bread" is "bread". The Frenchman only knows that he sells "pain", but a dictionary (profile) says pain=bread. The German only knows that he buys "brot", but a dictionary (profile) says brot = bread. "Pain" is sold and "brot" is bought in the bread exchange, but both are "bread" as they've been transacted through the same reference information relating the two.

Taking this into the world of colour data:

Assume your image file has an embedded Pro Photo RGB colour space and it has a pixel with RGB 147, 74, 72 = L*a*b* 50, 60, 20 (a salmon tone). Your display is inaccurate, so given 50, 60, 20 it will show something else; but from profiling it (I'll get into how), we know it does show a colour = 50, 60, 20 when given 50, 50, 05. That profile says: "When I get 50, 60, 20 from the PCS, I'll give it to the display as an RGB equivalent of L*a*b* 50, 50, 05, so it will come out looking like L*a*b* 50, 60, 20" (see diagram below):


source profile ProPhoto
File value RGB 147,74,72
PCS L*a*b* 50,60,20
Matches for display L*a*b* 50,50,05
Matches for printer L*a*b* 50,45,10
display profile
50 50 05
130 89 92 RGB
On the display: looks like L*a*b* 50,60,20 RGB 147,74,72
printer profile
50 45 10
135 82 86 RGB
From the Printer looks like L*a*b* 50,60,20 RGB 147,74,72 CMYK 13,91,56,1

The same approach for the same reason applies to profiling printer/paper and sending file data to print; but another profile is needed which characterizes this printer/paper's specific colour rendition, as it renders colour numbers differently than does the display. In the illustration above it produces L*a*b* 50,60,20 (RGB 147,74,72) if given an RGB equivalent of L*a*b* 50,45,10, which on paper will look like RGB 147,74,72; the printer driver prints it in CMYK as 13,91,56,1 (being the CMYK equivalent hue).

While our inkjet printers print with CMYK inks, they are "RGB" devices because RGB is input to the printer driver and the driver makes the conversion from RGB to CMYK for printing. Avoid confusing the driver: DO NOT send CMYK colours to the printer.

Matching from display to print will be close but not exact because the display transmits light and paper reflects light, creating some unavoidable difference of appearance.

Rendering Intents (RI - to deal with out-of-gamut colour):

There are four:

- **Relative Colorimetric (RelCol)**
- **Perceptual**
- **Absolute Colorimetric (AbsCol)**
- **Saturation**

Use RelCol or Perceptual for managing OOG colours:

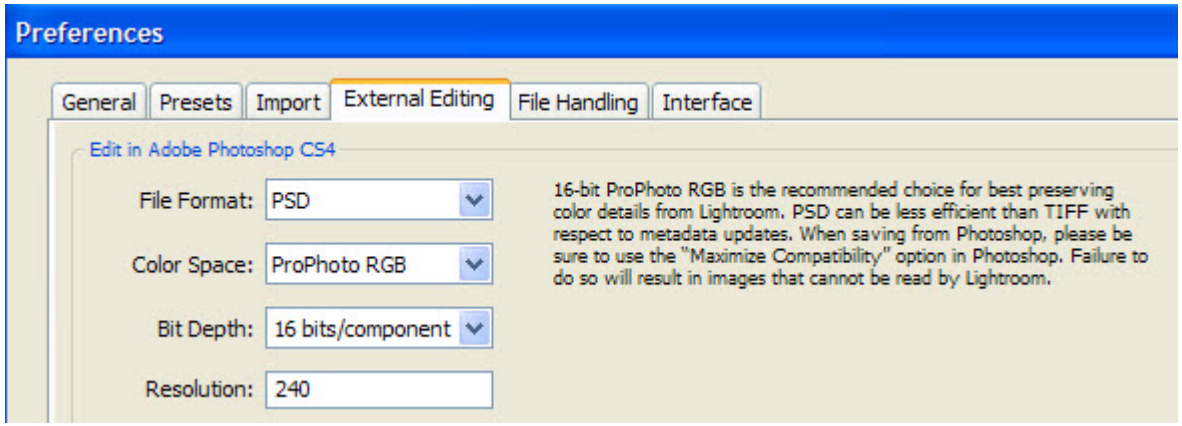
RelCol merges OOG hues with their closest in-gamut hues and leaves everything else alone. Perceptual remaps all colours in the source space so they fit inside the destination space. It's best to test the effect of each before printing (we'll see how).

AbsCol helps reproduce detail in snow and AbsCol or Saturation will produce more saturated, "posterized" hues.

We set RI in Photoshop "Color Settings" and at printing.

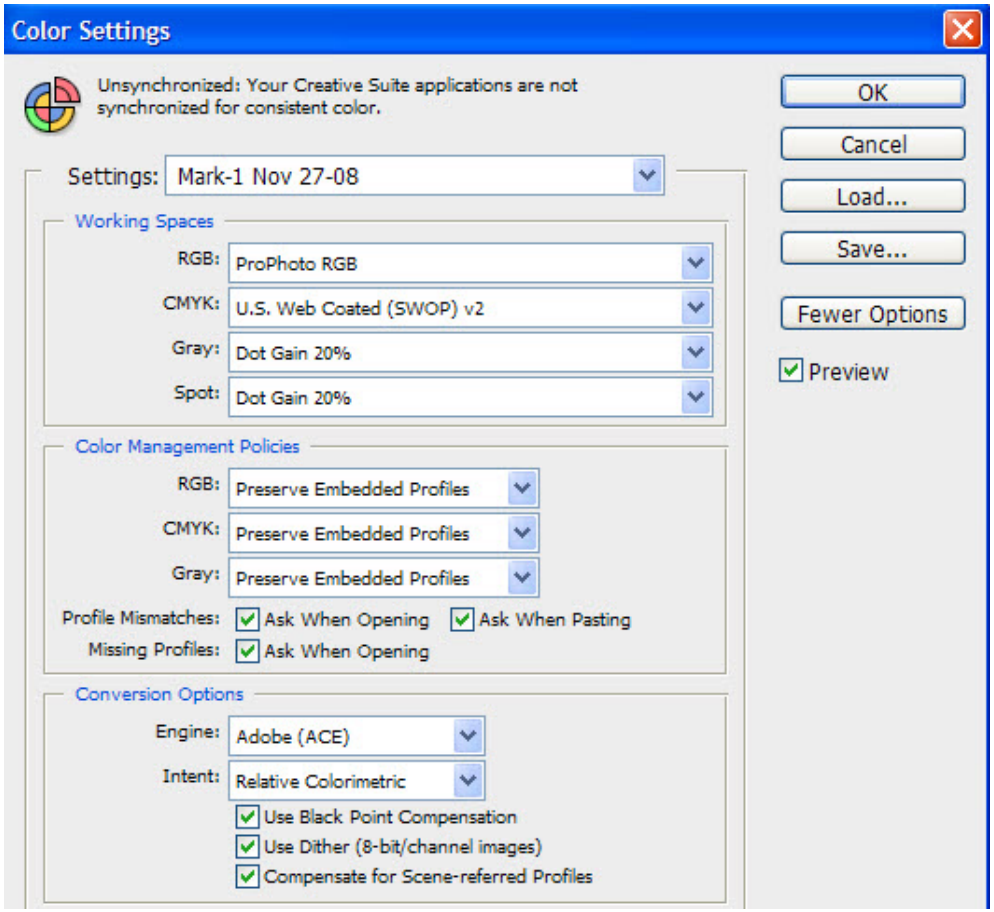
(3) Set-up Colour Management in the Imaging Program

Colour management is hard-wired under the hood in Lightroom. It uses a ProPhoto 16-bit colour space with linear gamma for processing and a more "natural" 1.8 gamma for display. But you do select options for exporting images from Lightroom to Photoshop:


Preferences
General
Presets
Import
External Editing
File Handling
Interface
Edit in Adobe Photoshop CS4
File Format:
PSD
Color Space:
ProPhoto RGB
Bit Depth:
16 bits/component
Resolution:
240
16-bit ProPhoto RGB is the recommended choice for best preserving color details from Lightroom. PSD can be less efficient than TIFF with respect to metadata updates. When saving from Photoshop, please be sure to use the "Maximize Compatibility" option in Photoshop. Failure to do so will result in images that cannot be read by Lightroom.

The choices are PSD or TIFF, ProPhoto, ARGB(98) or sRGB, 16-bit or 8-bit, and your preferred resolution (PPI). The recommended set-up is what you see above.

Photoshop has the most extensive set of CM options of the programs we discuss here. You access it under Edit > Color Settings, and select "More Options" to see all.



For the web and inkjet printing, ignore everything related to CMYK and Gray.

In the Working Spaces (1st) section, for RGB select ProPhoto for reasons we've discussed.

In the Color Management Policies (2nd) section, for RGB select "Preserve Embedded Profiles". If you receive or work with an image from another colour space, this allows you to see the intended starting colours for that image. You can convert it to ProPhoto any-time you want using Edit>Convert to Profile.

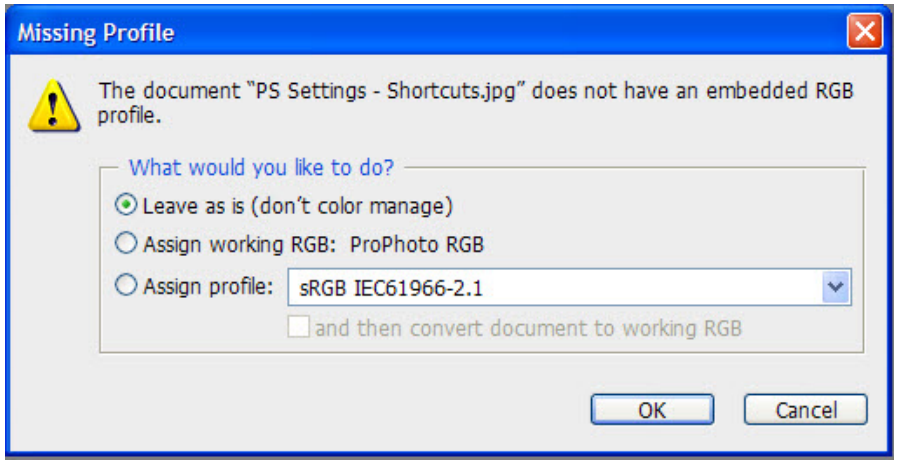
Check all warning boxes for mismatched and missing profiles: gives you knowledge and choice for handling.

What the warnings are about:

You have a selected working colour space in Photoshop (e.g. ProPhoto). You open a file which has a different or no working space embedded. With the warning checked, Photoshop asks you what you want to do about it. Without checking the warning, Photoshop will use your working colour space (ProPhoto in this case).

Likewise, if you are working with e.g. two images having different embedded colour spaces and you are pasting one into the other, Photoshop needs to know what to do with the one being pasted, otherwise it will assume the ProPhoto working colour space in this case.

If you try to open an "untagged" image in Photoshop (i.e. no embedded profile), you will be offered choices shown here:


Missing Profile
The document "PS Settings - Shortcuts.jpg" does not have an embedded RGB profile.
What would you like to do?
Leave as is (don't color manage)
Assign working RGB: ProPhoto RGB
Assign profile:
sRGB IEC61966-2.1
and then convert document to working RGB
OK
Cancel

"Leave as is" interprets the file according to the active working space (here ProPhoto), but without embedding (tagging) the profile in the image.

If you "Assign" there are three choices:

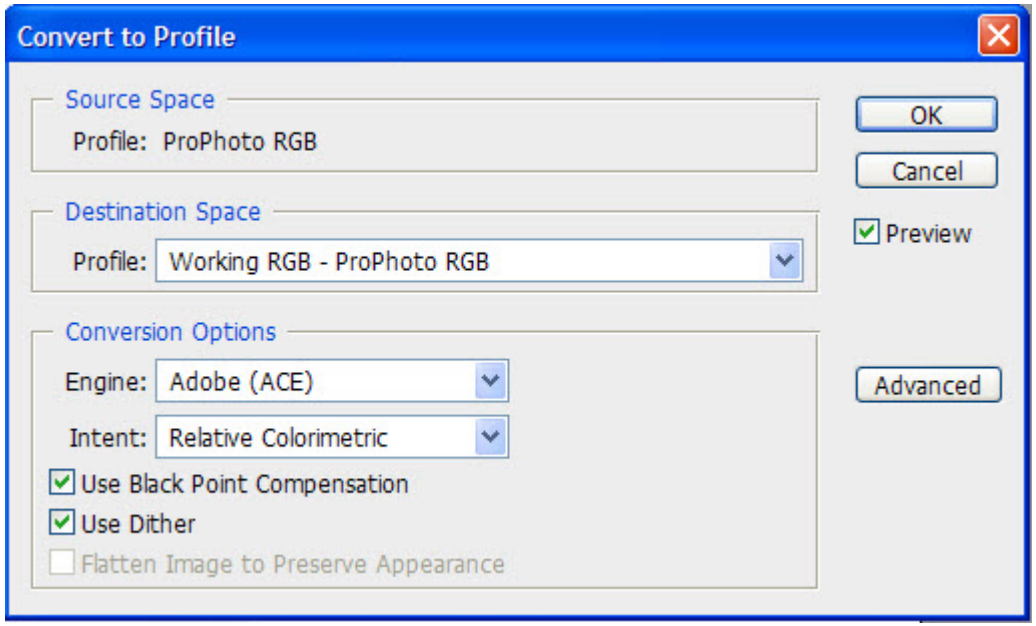
1. **Tag the file with the active working space (here ProPhoto);**
2. **Tag the file with a working space you select;**
3. **As (2) but then Convert (i.e. change) the file numbers to those of the active working space, (here ProPhoto).**

In (1) or (2) file numbers are unchanged, but interpreted according to the current or selected working space.

In (3), appearance is unchanged, but the file numbers change.

Once you save the image, options (1) to (3) embed either the active or selected working space profile.

But you can embed another profile with "Edit>Convert to Profile", and preview the result on your display:



Use the "Destination Space" dropdown to select the profile you wish to embed. Keep the "Engine" in Adobe ACE, and select the "Intent". Leave the two check boxes checked.

Appendix 2

FOGRA Reports on SilverFast
iT8 Profiling Targets and Auto iT8 Profile Accuracy

Report 23024
Report 23126

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8. July 2009

Order from:	LaserSoft Imaging AG Mr. Rossee Luisenweg 6-8 24105 Kiel
Order of:	17.04.2009 Mr. Rossee
Report prepared by:	Dipl.-Ing. [FH] Peter Karp Dipl.-Ing. Andreas Kraushaar
Task:	Conformance check of submitted charts according to ISO 12641
Submitted material:	1x IT8.7/1 chart 1x IT8.7/2 chart

Documents enclosed:

The publication of this Technical Report, especially in parts, or its use in court of law requires prior consent by Fogra.

1. Task:

The submitted test charts (one transmission target and one reflective target) are subject to an ISO 12641 [4] conformance check focussing on the colorimetrical accuracy.

2. Bibliography:

[1] Dolezalek, F.:
ProzessStandard Offsetdruck
Wiesbaden: Bundesverband Druck und Medien e. V., 2001
und Ergänzung vom Mai 2003

[2] ISO 13655:1996
Graphic technology -- Spectral measurement and colorimetric computation for graphic arts images
How to get: Beuth-Verlag, 10772 Berlin [www.beuth.de]

[3] Norm ISO 12647-2:2004/ Amd 1
Graphic technology -- Process control for the production of half-tone colour separations, proof and production prints -- Part 2: Offset lithographic processes
How to get: Beuth-Verlag, 10772 Berlin [www.beuth.de]

[4] Norm ISO 12641:1997
Graphic technology -- Prepress digital data exchange -- Colour targets for input scanner calibration
How to get: Beuth-Verlag, 10772 Berlin [www.beuth.de]

3. Target Design

ISO 12641 defines requirements and tolerances for a specific target design, colorimetrical aim values as well as for the designation ("Labelling") for both reflective and transmissive targets. A typical design is illustrated in Fig. 1.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
A B C D E F G H I J K L
www.SilverFast.com
Printed on Kodak Professional Endura
IT8.7/2-1993
2009:02
LaserSoft Imaging
R090204

Fig. 1: Scan of the submitted reflection target (15 x 10 cm) – „R090204".

The target is designed with 5 distinct sections. These are:

1. Sampled colour area [A1 to L12]
2. Colour dye scales [A13 to L19]
3. Neutral dye scale [Grey wedge at the bottom]
4. Dmin/Dmax area
5. Vendor-optional area

Subject of this scrutiny is the evaluation of the colorimetrical accuracy with respect to the sections 1 and 3. In addition an informative evaluation comprising all patches will be conducted.

4. Reference and Colour Measurement

Depending on the nature of the given colour measurement data ISO 12641 differentiates two kinds of targets. Calibrated targets are test charts which have been whilst uncalibrated targets are usually accompanied by measurements reflecting the batch mean.

In this report both targets represent “uncalibrated targets” where the pertinent reference values (reflecting the batch mean) have been downloaded from http://www.silverfast.com/it8calibration/. Here the ID “R090204“ have been used for the reflection target and ID „T080209“ for the transmission one).

Both targets have been measured according to [2] with the measurement device SpectraScan T (X-RITE). The aperture was 2 mm and the geometry d:0°. The reflection target was measured under 45°:0° and an aperture of 4,5 mm.

5. Normative Requirements

5.1 Target layout and physical characteristics

5.1.1 Transmissive Target

Both the target size (ca. 9,9 cm x 12,6 cm) and the patch dimensions 4,5 mm x 4,5 mm are in conformance with the required aim values for “ISO 12641 Type 1“.

All non-image areas of the target shall be approximately neutral and shall have a lightness (L*) of approximately 50. This can be confirmed with a measured CIELAB values of 56; 0; -1 [2°].

It could be further attested that the non-image area do extend at least 4,5 mm beyond the row and column borders on the top and sides and at least 10 mm on the bottom to provide for identification information. The remaining requirements such as fiducial marks are also in conformance with ISO 12641. It should be mentioned here that the required label of “ISO 12641:1997“ is missing. Instead the informal designation „IT.8.7/1-1993“ has been used. But this is not a

substantial issue since targets bearing the designation IT8.7/1-1993 are prepared in accordance with ANSI ITS.7/I-1993 whose technical requirements are identical to ISO 12641 [see Note 6 of ISO 12641].

5.1.2 Reflection Target

The requirements have been met both for the target size (12,5 mm x 17,8 mm) and the patch size (6,5 mm x 6,5 mm). The non-image parts can be attested to being neutral while having a CIELAB value of 56; 0; -2 [D50/2°].

5.2 Colour accuracy [„Colour Gamut Mapping“]

The hue angle, lightness, and chroma of the target patches contained in the sampled colour area portion of the target, Rows A through L and Columns 1 through 12 (category 1), shall be in accordance with [4]. There are no aim values for the patches in column 4, 8 and 12. For uncalibrated targets, as tested in this report, for the patches contained within A1 through L3, A5 through L7, and A9 through L2, 99% shall be within ΔE^*_{ab} = 10 of the aim values specified in [4]. In addition it is required that for each manufacturing batch 99% of the patches within the manufacturing batch (contrary to the requirement before the reference here is the measurement file from the manufacturer) shall be within $\Delta E^*_{ab} \leq 5$ of the reference.

In addition and for information only the requirements for calibrated targets should be mentioned here. In this case the measured values for each patch shall be provided together with a certificate as to the degree of conformance of the measuring laboratory to an accredited measurement assurance program (MAP) sponsored by a recognized national standardizing laboratory. The goal is that all measurements will be accurate within $\Delta E^*_{ab} \leq 2$.

5.2.1 Results: Transmissive Target

The results of the colorimetrical evaluation are given in Tab. 1. The individual measurement values will be provided separately by means of a spreadsheet. In addition the results of the modern CIEDE2000 colour difference formula is illustrated. The results show an excellent conformance to the required aim values.

	ΔE^*_{ab}	Tol.	Result
Mean	1,3	-	
Maximum	4,0	-	
99% Quantile	3,4	10	OK
	ΔE00	**Informative**	
Mean		1,0	
Maximum		3,6	
99% Quantile		3,2	

Tab. 1: Colorimetrical evaluation of the transmissive target.

5.2.2 Results: Reflective Target

The results of the colorimetrical evaluation are given in Tab. 2. The individual measurement values will be provided separately by means of a spreadsheet. In addition the results of the modern CIEDE2000 colour difference formula is illustrated. The results show an excellent conformance to the required aim values.

	ΔE^*_{ab}	Tol.	Result
Mean	1,7	-	
Maximum	4,9	-	
99% Quantile	4,2	10	OK
	ΔE00	**Informative**	
Mean		1,1	
Maximum		2,4	
99% Quantile		2,3	

Tab. 2: Colorimetrical evaluation of the reflective target.

5.3 Dye Scale Values

From the given requirements (Clause 4.2.4) the following requirements can be deduced.

5.3.1 Transmittance Target

The patches B16 through K16 shall be equally spaced in CIEL* between the L* values of patches B16 and K16. The positive result is depicted in Fig. 2.

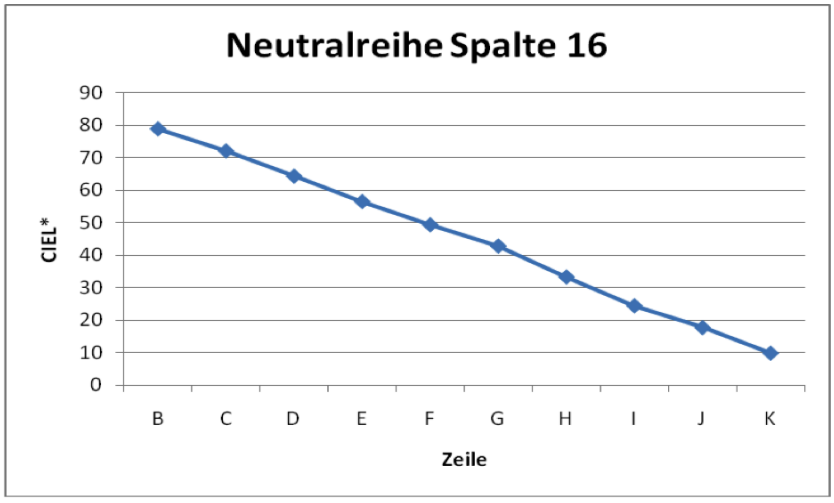

Fig. 2: Evaluation of CIEL*-spacing of the patches in columns B16 until K16.

5.3.2 Reflection Target

The patches B16 through K16 shall be equally spaced in CIEL* between the L* values of patches B16 and K16. The positive result is depicted in Fig. 3.

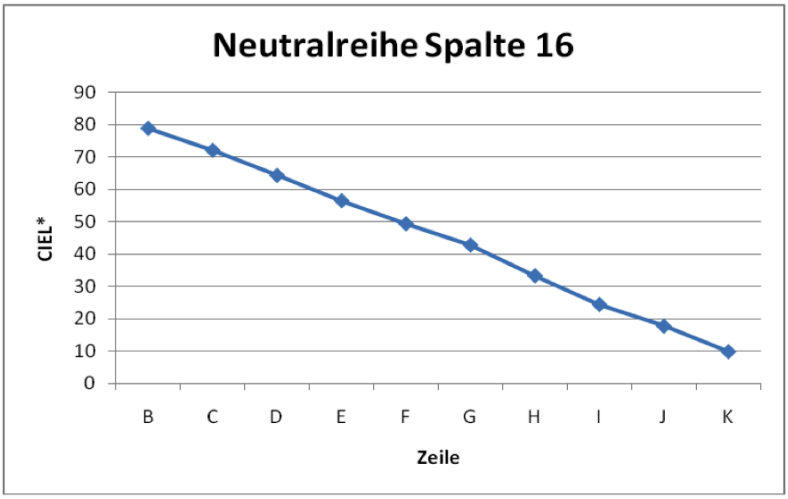

Fig. 3: Evaluation of CIEL*-spacing of the patches in columns B16 until K16.

5.4 Neutral Scale Values

5.4.1 Transmittance Target

The evaluation of the neutral scale values was conducted by means of the CIEL* and CIEC* (being zero) values, see Fig. 4. The requirements are well fulfilled.

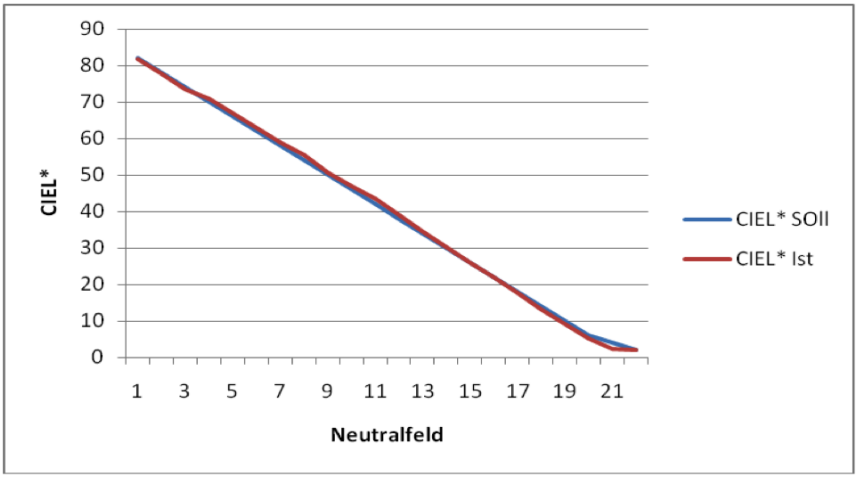

Fig 4: Colour accuracy of neutral scale values (reference: blue and measurement: red).

5.4.2 Reflection Target

The evaluation of the neutral scale values was conducted by means of the CIEL* and CIEC* (being zero) values, see Fig. 5. The requirements are very well fulfilled.

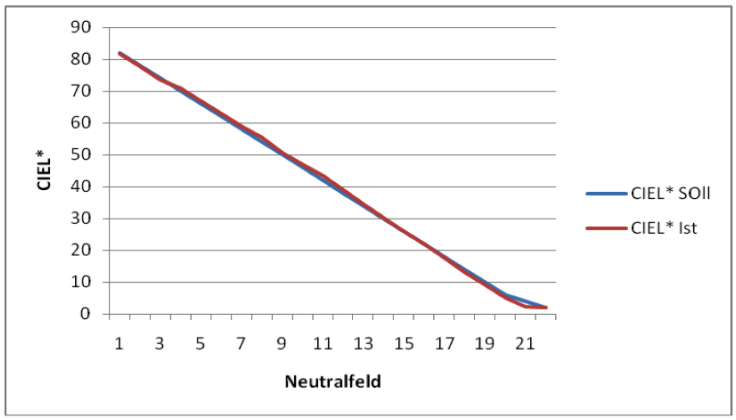

Fig. 5: Colour accuracy of neutral scale values (reference: blue and measurement: red).

6. Conclusion

The evaluation shows an excellent conformance of the tested transmissive and reflection targets with respect to ISO 12641. The tested targets furthermore excess the demand criteria for uncalibrated targets by fulfilling the rigorous tolerances of calibrated targets.

Fogra

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4. September 2009

Order from:	LaserSoft Imaging AG Mr. Rossee Luisenweg 6-8 24105 Kiel
Order of:	17.06.2009 Mr. Rossee
Report prepared by:	Dipl.-Ing. Andreas Kraushaar Dipl.-Ing. Claas Bickeböller
Task:	Colour accuracy assessment of the SilverFast software with the scanner Epson V750
Submitted material:	1x IT8.7/1 chart 1x IT8.7/2 chart 1x DVD SilverFast software package

Documents enclosed:

The publication of this Technical Report, especially in parts, or its use in court of law requires prior consent by Fogra.

1. Task:

The colorimetrical accuracy of the scanned test charts (a IT8.7/1 transmission target and a IT8.7/2 reflective target [3]), using an Epson V750 scanner, should be evaluated.

2. Bibliography:

[1] Kraushaar, A.:
Quality assessment of colour management profiles
Munich, Fogra, Research project Nr. 10.045, 2006

[2] ISO 13655:1996
Graphic technology -- Spectral measurement and colorimetric computation for graphic arts images
How to get: Beuth-Verlag, 10772 Berlin [www.beuth.de]

[3] Norm ISO 12641:1997
Graphic technology -- Prepress digital data exchange -- Colour targets for input scanner calibration
How to get: Beuth-Verlag, 10772 Berlin [www.beuth.de]

3. Software Setup

The software “SilverFast” (version 6.6.1r1a) has been installed on a MS Windows XP operating system. The scanner, Epson Perfection V750 Pro, was connected to the computer via USB.

Before the scans have been made the lamp was warmed up by scanning 10 arbitrary images. Both the reflective and the transmissive (positive polarity) scans have been made after an automatic “IT8-calibration”. Though two ICC-scanner profiles have been created. The scanning resolution was 300 dpi (dots/pixels per inch), the mode was RGB, 16 bit per channel, and the pertinent ICC-profile was tagged to the scanned images. All automatic transformation have been switched off. The detailed scanning and colour management settings are depicted in the figures 1 to 3.

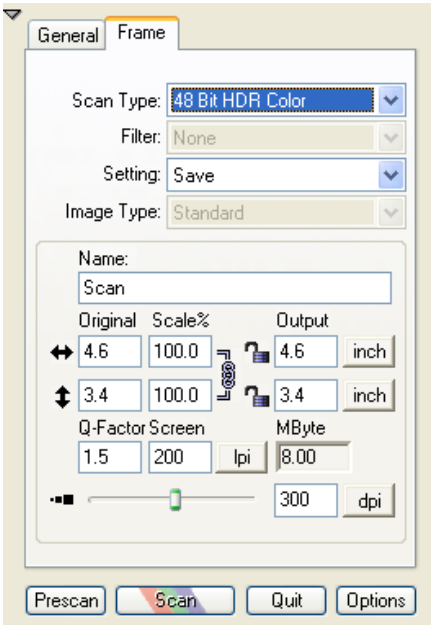

Fig. 1: Basic settings for both the reflective and transmissive mode.

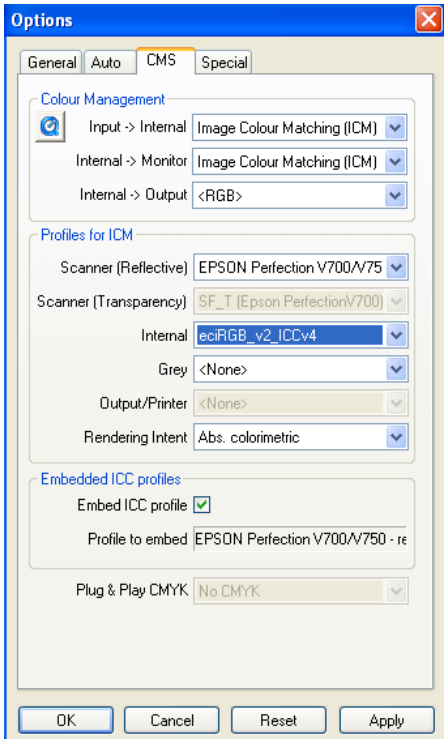

Fig. 2: Colour management settings for the reflective sample.

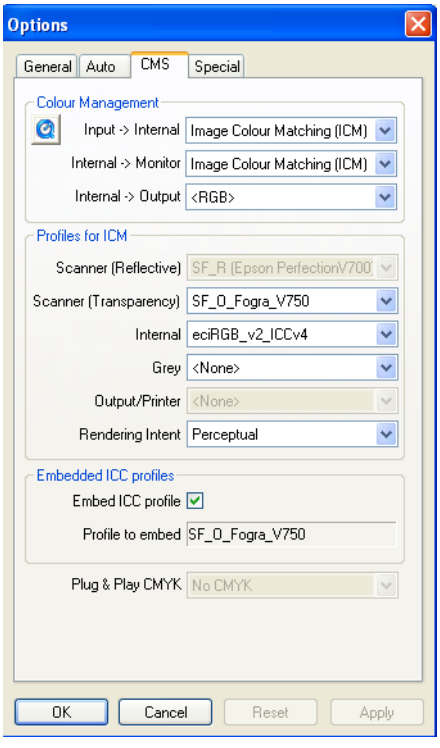

Fig. 3: Colour management settings for the transmissive sample.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
A B C D E F G H I J K L
www.SilverFast.com
Printed on Kodak Professional Endura
IT8.7/2-1993
2009:02
LaserSoft Imaging
R090204

Fig. 4: Scan of the reflection target (15 x 10 cm) – „R090204“.

4. Data preparation

The scanned RGB images have been converted to CIELAB, 8 bit per channel, using Adobe Photoshop CS3. The rendering intent was “absolute coloirmetric” and the used CMM was the “Adobe (ACE)”. The resulting 8bit CIELAB images have been used to identify the mean CIELAB-values for all patches. For each colour patch a sample area of 10 x10 pixels (100 pixels) has been used.

5. Colorimetrical evaluation

The reference CIELAB values [2] for both targets haven been downloaded from http://www.silverfast.com/it8calibration/. A barcode printed on the targets provides an unambiguous assignment namely the ID “R090204“ for the reflection target and ID „T080209“ for the transmission sample.

The resulting CIELAB-values have been then statistically analyzed against the corresponding reference. The results are tabled in Table 1 and visualized in figures 5 and 6.

Colour difference	Reflective scan	Transmissive scan
ΔE^*_{ab} (mean)	1,2	1,7
ΔE^*_{ab} (max)	9,8	9,7
ΔE^*_{ab} (std)	1,4	1,4
ΔH (mean)	0,5	0,8
ΔH (max)	5,8	4,3
ΔH (std)	0,8	0,8
ΔE^*_{00} (mean)	0,8	1,0
ΔE^*_{00} (max)	8,1	4,3
ΔE^*_{00} (std)	0,9	0,7
95% quantile (ΔE^*_{ab})	3,3	4,4

Table 1: Statistical evaluation of the colorimetrical accuracy of the scanned images.

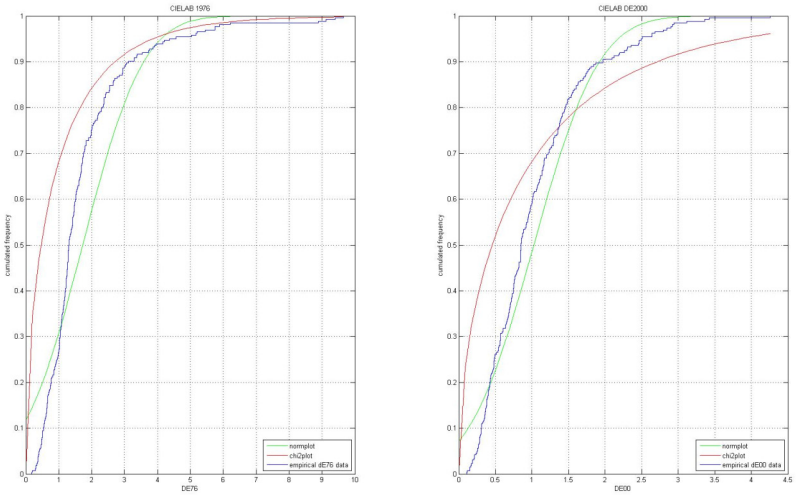

Fig. 5: Cumulative frequency plot of the CIE1976 and CIEDE2000 colour differences – transparency scan.

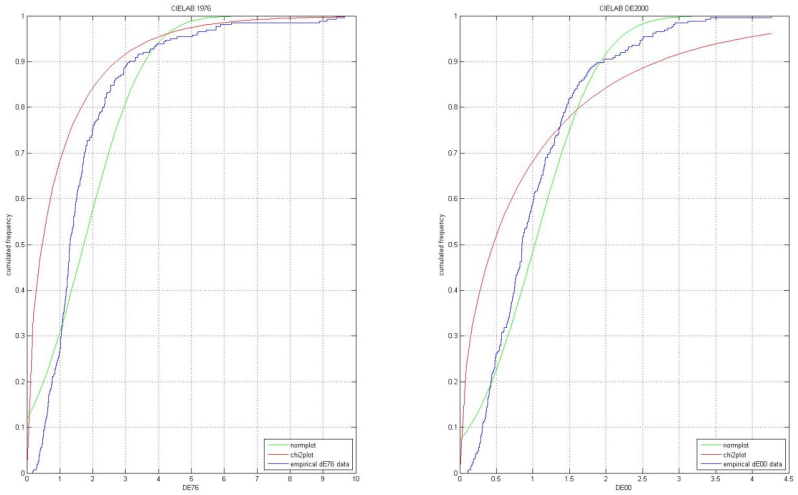

Fig. 6: Cumulative frequency plot of the CIE1976 and CIEDE2000 colour differences – reflective scan.

6. Conclusion

In the light of an extensive field test of scanner profiling tools conducted by Fogra [1] the evaluation of the colorimetrical accuracy of the SilverFast software solution shows a very good quality for both the transmissive and reflective IT8-testchart. Especially the automatic colour calibration (“IT8-calibration”) seemed to be very useful in the field.

Fogra
Fogra Graphic Technology Research Association

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Appendix 3

Colour Consistency and Scanner Profiling

The colour consistency objective is to produce a scanned image for print or web which is as faithful as possible to the original media with minimal post-processing for colour balance or luminosity. Because every scanner model sees colours and luminosity differently, they should be custom-profiled for best results, and the appropriate profile used in a colour-managed workflow.

There are two major issues with this: firstly, a number of scanners have difficulty performing consistently, such that the exposure conditions in which the profile was created are not necessarily stable in use; hence unexpected outcomes can occur even with a colour-managed scanner. Secondly, it is not possible to profile a scanner for colour negative film, the alternative in SilverFast being to use their Negafix module which has a large number of canned film profiles for producing a decent positive image.

Without the luxury of costly colour management tools, one cannot perform automated comprehensive Delta-E calculations for measuring the overall performance of a profile relative to all of the data in the profiling target's reference file. An alternative "manual" procedure is described below, which reflects similar principles in reduced-form. The possible merit of this procedure is that anyone with a spreadsheet, SF8, the profiling target reference file and Photoshop (or another external editor allowing one to measure the L*a*b* values of target patches) can do it without investing in third-party colour management software.

The reference file which accompanies a profiling target contains the colour values for each patch in the target, usually in L*a*b and XYZ colour measurement scales. One can measure the internal consistency of a profile's behaviour as follows:

First, perform the Auto-IT8 profiling process using the relevant SilverFast IT8 target for the film stock being profiled (especially the Kodachrome target for Kodachrome film) and leave the target in the scanner.

Second, with the resulting profile now loaded (automatically) as the default profile for that scanner and film combination, scan the target (as one would scan an ordinary photograph) to open as a TIFF file in Photoshop. Gamma and colour space should be the same for the scan and in Photoshop.

Third, use Photoshop's eyedropper and info panel to measure the L*a*b* values of a set of patches in the TIFF scan of the target and compare these measurements with the values for the same patches in the target's reference file.

The difference between the measured and the reference file values is an indication of the extent of the profile's performance error, which is formalized in a "Delta-E" or "dE" calculation. We call this a "round-trip" internal consistency check – to see how well a

profile created from a target can reproduce the values of that target when it is scanned as a photo. If the dE values are less than 1 (it is suggested that even up to 2.3 would be hard to see), this means that at least the profile is behaving with very high internal consistency. Whether it also produces a reasonably accurate scan on normal photographs still remains to be determined; but for that to happen, a "pass" on the round trip internal consistency check is a necessary, although not necessarily sufficient condition.

To make this exercise tractable for present purposes (which are indicative, and not claimed to be 100% determinative), I selected the "grayscale" band of patches across the bottom of the SilverFast target (Figure 3A.1, right of red arrow). I put "grayscale" in quotation marks, because even though they look grey, the reference values for those patches on my target indicate that they are not gray, and indeed they do not measure as gray in these tests. (To be gray, a* and b* each need to be 0, whereas these values vary within a range of several points around zero.) A sample set of measurements using this band could be a decent initial indicator of profile performance for the target as a whole, but for greater assurance one can of course measure other colour patches using the same approach.

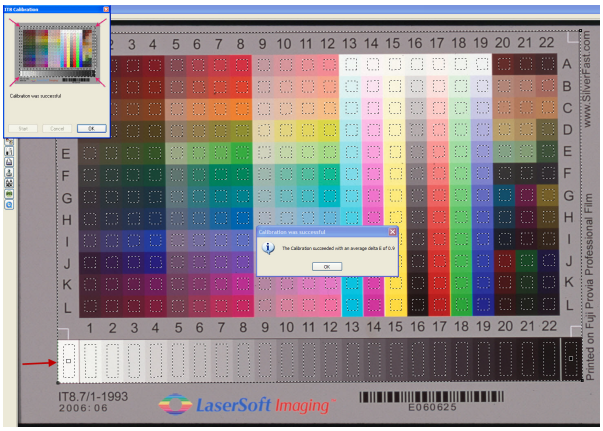


Figure 3A.1. Auto IT8 Calibration

Once all 24 patches are measured, the differences between measured and reference values are noted and then averaged in three sets: one for L*, one for a* and one for b*, with an aggregate average provided for a* + b*. The arithmetic is shown below in the sidebar "The Arithmetic (Used Here) of Profile Measurement", which you may skip if your main interest is the gist of the story-line, rather than the details; the source for the formulae used is CIE dE (1976), which calculates mathematical differences without taking into account certain aspects of human visual perception in the manner that the more complex dE2000 formula would.

The Arithmetic (Used Here) of Profile Measurement

The measurement of the L*a*b* values was done with Photoshop's eyedropper set to 31*31 pixels, the eyedropper being kept in the middle of each patch. This assured that

variances within patches – which do occur – are averaged, without poaching values from neighbouring patches.

For each patch, the dE (independently for each of L*, a*, and b*) = SQRT[(R-M)^2], where:

M = measured value,
R = reference file value, and
SQRT = square root.

The average dE of the 24 patches in any one series = $\{SUM_{0.....23}\ [SQRT(R\text{-}M)^2]\}/24$.

The average dE of a* + b* = $\{SUM_{0.....23}\ [SQRT\ (a^*+b^*)]\}/24$,
Where SQRT $(a^*+b^*) = SQRT\{[(R\text{-}M)^2]_{a^*} + [(R\text{-}M)^2]_{b^*}\}$

To do this for three scanners (Nikon Super Coolscan 5000ED, Plustek 7600i and Epson V750-M) , two film types (Fuji and Kodachrome) and two profile types (custom and canned) required six spreadsheets with six sets of 24 differences (L*, a* and b* for custom and canned profiles) each. The set-up of each spreadsheet looks like the one shown in Figure 3A.2 below for the Plustek scanner using the Fuji target.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
1	Plustek IT8 Fuji		white	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	black	AVG
2	Custom	L*R	88.46	86.98	83.80	79.77	76.09	72.28	68.23	64.04	59.89	55.72	51.10	46.65	42.35	37.75	33.61	29.16	24.86	20.87	16.38	11.66	7.09	3.91	1.43	0.87	
3		L*M	89.00	87.00	84.00	80.00	76.00	73.00	69.00	64.00	60.00	56.00	51.00	47.00	42.00	38.00	34.00	29.00	24.00	20.00	15.00	10.00	6.00	3.00	2.00	1.00	
4		Diff^2	0.29	0.00	0.04	0.05	0.01	0.52	0.59	0.00	0.01	0.08	0.01	0.12	0.12	0.06	0.15	0.03	0.74	0.76	1.90	2.76	1.19	0.83	0.32	0.02	
5		SQRT	0.54	0.02	0.20	0.23	0.09	0.72	0.77	0.04	0.11	0.28	0.10	0.35	0.35	0.25	0.39	0.16	0.86	0.87	1.38	1.66	1.09	0.91	0.57	0.13	0.5
6																											
7		a*R	-1.66	-2.92	-2.83	-2.74	-2.41	-2.49	-2.75	-2.60	-3.24	-2.77	-3.40	-3.27	-3.26	-3.07	-3.35	-3.08	-3.72	-3.13	-3.03	-3.04	-2.08	-1.50	-1.27	-0.16	
8		a*M	-1.00	-3.00	-3.00	-3.00	-2.00	-2.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-2.00	-3.00	-2.00	-2.00	-2.00	-1.00	0.00	0.00	0.00	-2.00	-1.00	
9		Diff^2	0.44	0.01	0.03	0.07	0.17	0.24	0.06	0.16	0.06	0.05	0.16	0.07	0.07	1.14	0.12	1.17	2.96	1.28	4.12	9.24	4.33	2.25	0.53	0.706	
10		SQRT	0.66	0.08	0.17	0.26	0.41	0.49	0.25	0.40	0.24	0.23	0.40	0.27	0.26	1.07	0.35	1.08	1.72	1.13	2.03	3.04	2.08	1.50	0.73	0.84	0.8
11																											
12		b*R	0.69	1.65	1.17	0.35	0.35	-0.03	-0.53	-1.08	-1.37	-1.53	-2.05	-2.59	-2.75	-3.06	-2.92	-2.95	-3.29	-3.20	-3.70	-3.43	-3.33	-1.94	-1.39	-0.28	
13		b*M	1.00	2.00	1.00	0.00	0.00	0.00	-1.00	-1.00	-2.00	-2.00	-2.00	-3.00	-3.00	-4.00	-3.00	-4.00	-4.00	-4.00	-5.00	-5.00	-6.00	-5.00	-3.00	-3.00	
14		Diff^2	0.10	0.12	0.03	0.12	0.12	0.00	0.22	0.01	0.40	0.22	0.00	0.17	0.06	0.88	0.01	1.10	0.50	0.64	1.69	2.46	7.13	9.36	2.59	7.40	
15		SQRT	0.31	0.35	0.17	0.35	0.35	0.03	0.47	0.08	0.63	0.47	0.05	0.41	0.25	0.94	0.08	1.05	0.71	0.80	1.30	1.57	2.67	3.06	1.61	2.72	0.9
16																											
17	Total SQRT a*+ b*	SQRT	0.73	0.36	0.24	0.44	0.54	0.49	0.53	0.41	0.67	0.52	0.40	0.49	0.36	1.42	0.36	1.51	1.86	1.38	2.41	3.42	3.38	3.41	1.77	2.85	1.2
18																											
19	Canned	L*R	88.46	86.98	83.80	79.77	76.09	72.28	68.23	64.04	59.89	55.72	51.10	46.65	42.35	37.75	33.61	29.16	24.86	20.87	16.38	11.66	7.09	3.91	1.43	0.87	
20	SFT Optic 7600i	L*M	89.00	87.00	84.00	80.00	76.00	73.00	69.00	64.00	60.00	56.00	51.00	47.00	43.00	38.00	34.00	29.00	25.00	20.00	15.00	11.00	6.00	3.00	2.00	2.00	
21		Diff^2	0.29	0	0.04	0.05	0.01	0.52	0.59	0	0.01	0.08	0.01	0.12	0.42	0.06	0.15	0.03	0.02	0.76	1.9	0.44	1.19	0.83	0.32	1.277	
22		SQRT	0.54	0.02	0.20	0.23	0.09	0.72	0.77	0.04	0.11	0.28	0.10	0.35	0.65	0.25	0.39	0.16	0.14	0.87	1.38	0.66	1.09	0.91	0.57	1.13	0.5
23																											
24		a*R	-1.66	-2.92	-2.83	-2.74	-2.41	-2.49	-2.75	-2.60	-3.24	-2.77	-3.40	-3.27	-3.26	-3.07	-3.35	-3.08	-3.72	-3.13	-3.03	-3.04	-2.08	-1.50	-1.27	-0.16	
25		a*M	-1.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-2.00	-2.00	-1.00	-1.00	-4.00	-3.00	
26		Diff^2	0.44	0.01	0.03	0.07	0.35	0.26	0.06	0.16	0.06	0.05	0.16	0.07	0.07	0	0.12	0.01	0.52	0.02	1.06	1.08	1.17	0.25	7.45	8.066	
27		SQRT	0.66	0.08	0.17	0.26	0.59	0.51	0.25	0.40	0.24	0.23	0.40	0.27	0.26	0.07	0.35	0.08	0.72	0.13	1.03	1.04	1.08	0.50	2.73	2.84	0.6
28																											
29		b*R	0.69	1.65	1.17	0.35	0.35	-0.03	-0.53	-1.08	-1.37	-1.53	-2.05	-2.59	-2.75	-3.06	-2.92	-2.95	-3.29	-3.20	-3.70	-3.43	-3.33	-1.94	-1.39	-0.28	
30		b*M	1.00	2.00	1.00	0.00	0.00	0.00	0.00	-1.00	-1.00	-1.00	-2.00	-3.00	-3.00	-3.00	-3.00	-3.00	-4.00	-4.00	-4.00	-4.00	-5.00	-4.00	-2.00	-1.00	
31		Diff^2	0.1	0.12	0.03	0.12	0.12	0	0.28	0.01	0.14	0.28	0	0.17	0.06	0	0.01	0	0.5	0.64	0.09	0.32	2.79	4.24	0.37	0.518	
32		SQRT	0.31	0.35	0.17	0.35	0.35	0.03	0.53	0.08	0.37	0.53	0.05	0.41	0.25	0.06	0.08	0.05	0.71	0.80	0.30	0.57	1.67	2.06	0.61	0.72	0.5
33																											
34	Total SQRT a*+ b*		0.73	0.36	0.24	0.44	0.69	0.51	0.59	0.41	0.44	0.58	0.40	0.49	0.36	0.09	0.36	0.09	1.01	0.81	1.07	1.19	1.99	2.12	2.80	2.93	0.9
35																											
36	Pos Diff (SQRT)		OK	OK	OK	OK	0.15	0.02	0.05	OK	OK	0.05	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	1.03	0.08	
37																											

*Figure 3A.2. Plustek Fuji **dE** Measurement Spreadsheet*

Most of the higher dE results are in the dark tones, perhaps indicating that the lower signal:noise ratio at the dark end of the tonal range is the main cause.

Figure 3A.3 shows the bottom-line results by scanner, film type, profile type and measurement series.

	A	B	C	D
1	Condition	Average dE Values		
2		Plustek	Nikon	Epson
3	Fuji Custom			
4	L*	0.50	0.27	0.67
5	a*+b*	1.25	0.58	0.53
6				
7	Fuji Canned			
8	L*	0.49	1.05	1.56
9	a*+b*	0.86	2.14	1.82
10				
11	Kodachrome Custom			
12	L*	0.43	2.74	0.52
13	a*+b*	1.47	4.93	0.72
14				
15	Kodachrome Canned			
16	L*	3.04	0.97	0.46
17	a*+b*	5.29	3.19	0.89

*Figure 3A.3 Summary Results of **dE** Measurements*

Perhaps the most interesting aspect of these results is that there is no clear winner across the board. To summarize:

- Taking anything above 2 as an indicator of potential trouble, 6 values of the 24 are in this category, and of those, 5 are for Kodachrome and of those 5, 3 are for Nikon and 2 for Plustek.

- The Nikon scanner's relatively poor colour management performance with Kodachrome is very consistent with this scanner's reputation for having difficulty accurately scanning Kodachrome media. This is an interesting confirmation that the analytic approach taken here produces results consistent with other findings one can read in the literature.

- Custom profiles generally performed better than canned profiles, and that is to be expected because of variations between scanners even of the same model, which demonstrates value to SilverFast's Auto-IT8 custom profiling solution. The only exception on the chart is for Plustek Fuji, where surprisingly, the canned profile (also made by LSI) somewhat outperformed the custom profile. The difference between the two would hardly be noticeable in a print, even before post-scan adjustments in an external image-editing program.

- Finally, the Epson scanner did a really fine job with the Fuji custom profile and both Kodachrome profiles. In fact, it's fair to say that on the whole the Epson scanner handled Kodachrome the best of all three in respect of colour management outcomes.

Appendix 4

Scanning Grayscale Negatives

The basic approach to scanning grayscale negatives is similar to that for colour negatives, but without colour management and colour correction. The main distinctive concerns for grayscale scanning are to scan-in the full luminosity range of the media and to create neutral grays, which you can later tint to taste.

I discuss approaches to grayscale scanning in respect to:

- File Format and **iSRD**;
- Use of **Multi-Exposure**;
- Use of **Negafix**;
- Post Scan Workflow.

First Steps:

I'm using a medium format negative in an Epson Perfection V750 Pro flatbed scanner with SF8 Ai Studio for this demonstration. I made this photograph in Zanzibar, Tanzania, 42 years ago with a Graflex camera and 6*9 cm. roll-film back, using Ilford FP4 ASA 125 film, which I developed in an Agfa fine grain developer.

The first steps are to dust and clean the negatives, load them into the scanner using either the appropriate frame or, with this model scanner, on the glass bed provided for this purpose. I determined that if the negative is quite flat, using the frame is fine – perceptible sharpness will not differ whether the film is in the frame or on the Fluid Mount Accessory (FMA - Epson V750 Pro). However, if the negative were curled or otherwise uneven, to preserve sharpness it would be preferable to seal the negative onto the FMA glass using film cleaner as the sealant. This is convenient, because it doesn't leave any traces and needn't be cleaned off.

In the file format panel (Fig A4.1 overleaf, top of dock), select **Transparency**, select **Negative**, select **Bit Depth** (discussed below) and click on **Prescan**. I scanned a strip of two negatives, so both appear in the Preview window (Figure A4.1, right side). I positioned the red frame onto the bottom image – in this case giving it a slight tilt clockwise to align the building pillars parallel to the frame edge so that in the scanned photo the building would appear upright, and not tilted backward.

Having selected **Negative** and **16-bit** format, the **Negafix** and **Selective Color to Gray (SC2G)** tools become available (Figure A4.1 left side). I then click on the **Magnifier** (the tool under **Info** in the tool column right of the dock) and this fills the Preview window with the selected image. In **Negafix**, select the correct film information (Fig A4.1), as you would for a colour negative scan (Chapter Nine).

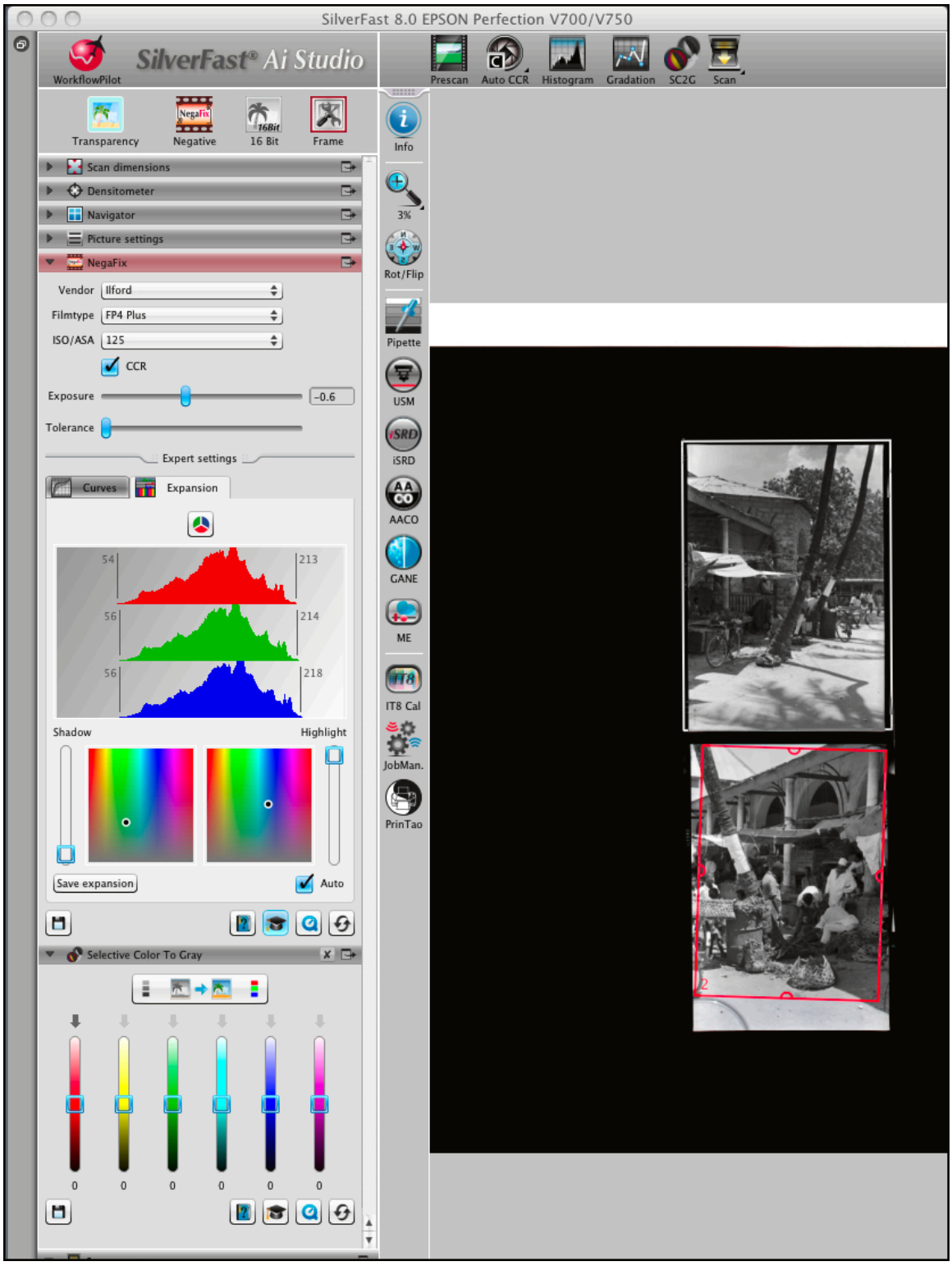


Figure A4.1 Prescan Layout

Bit Depth and iSRD

The possible bit-depth choices are as shown in Figure A4.2, drop-down menu.

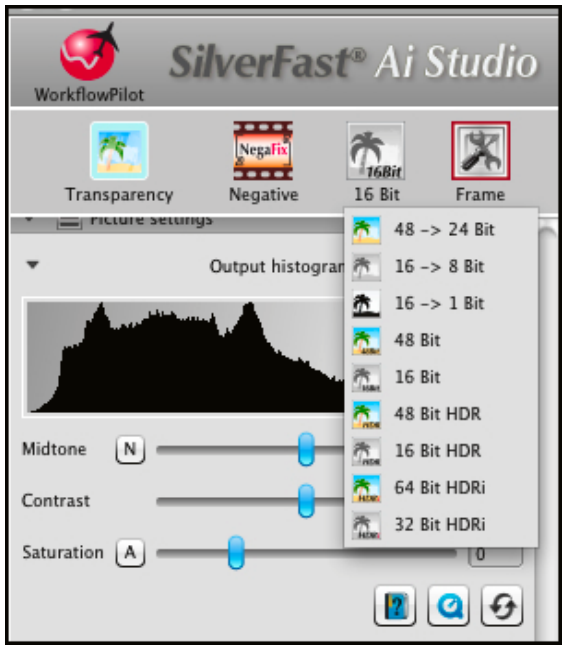


Figure A4.2 File Format Choices

Apart from chromogenic (Process C-41) grayscale film, the bottom two (for HDRi) are not applicable; neither iSRD nor other clean-up tools relying on the infrared channel can work with non-chromogenic grayscale film.

The distinction between 48-bit and 16-bit is that 48-bit produces an RGB scan (three color channels) and the 16-bit produces a one-channel grayscale scan, whether or not scanning for SilverFast HDR. Grayscale neutrality is better preserved selecting the 16-bit format, and this holds whether or not a specific Negafix profile is selected. The reason is that if the film itself has a characteristic non-gray hue, the 48-bit scan will show it, but the 16-bit scan will not. In my case, the Ilford FP4 film I scanned has a mild bluish hue as seen from the -3b* value (Figure A4.3 overleaf, left panel, measurement in Lab), whereas there is only a grayscale in the 16-bit scan (right panel). These readings are also confirmed in Photoshop, where the actual a* and b* readings are available for the grayscale scan.

I detected absolutely no difference in the quality of luminance information portrayed using either 48-bit or 16-bit formats; therefore to save myself the trouble of neutralizing a 48-bit scan, I simply scan in 16-bit. A fuller appreciation is provided showing the whole image in both formats (Figure A4.4).

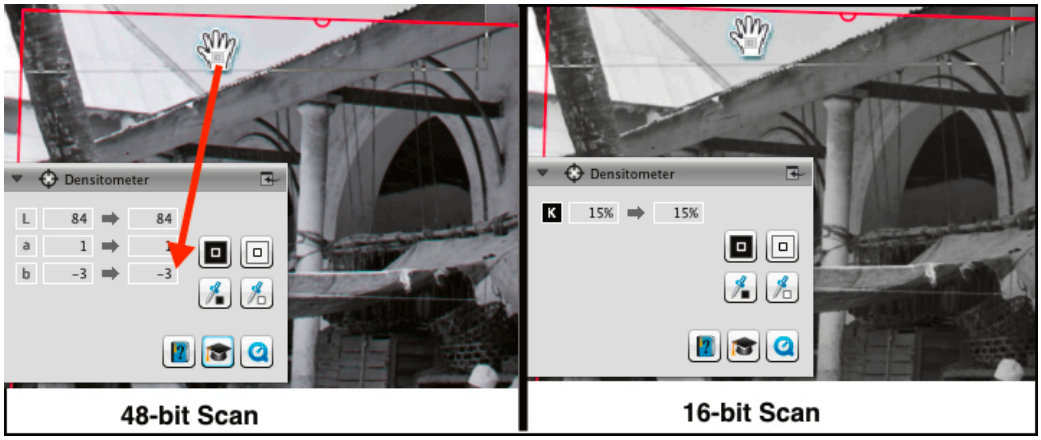


Figure A4.3 Hue Bias in 48-bit (left) vs. 16-bit (right) Grayscale Scan

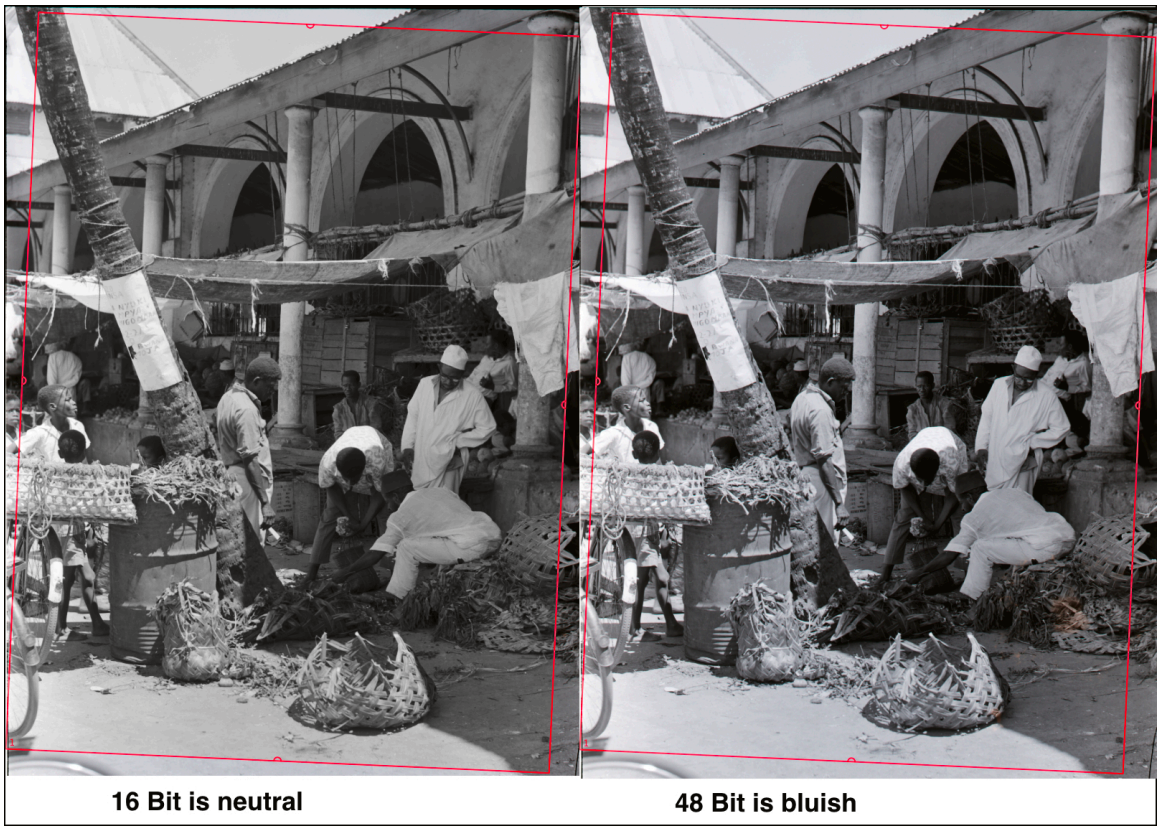


Figure A4.4 Neutral 16-bit (left) vs. non-neutral 48-bit (right)

This, however, is not the end of the story concerning the choice of file format. Let us say you intend to tint the image in a post-scan workflow. In this book, I consider three post-scan alternatives: SilverFast HDR, Lightroom and Photoshop. If you intend to tint the image in Photoshop, the original scan must be a 48-bit scan so that the three colour channels are retained. Photoshop's Black and White Adjustment Layer and its tinting capability are disabled for 16-bit grayscale scans. However, if you intend to tint the image in either SilverFast HDR or Lightroom, you may scan in 16-bit and retain tinting capability in both applications.

To do this in SilverFast HDR, select the **16-bit HDR** scan format, and after setting the scan dimensions and choice of **Multi-Exposure**, scan the image. It will scan as a negative (Figure A4.5). Don't worry about that.

Figure A4.5 HDR Scan of Grayscale Negative

Open the HDR scan in SilverFast HDR 8. Select **48-bit** format, even though this is a 16-bit original scan. Negafix should be active with your choice of scanner, film manufacturer, film type and ISO showing. Then click on **Global CC**, which will open **Global Color Correction** in the Dock. You may then use the colour wheel to select the exact tint you want, simply by moving the black dot in the center of the wheel into the hue you wish for the image (Figure A4.6 overleaf).

While in SilverFast HDR, if you were to select the **16-bit** format, instead of having access to the **Global CC** tool, you would have access to the **SC2G** tool. It doesn't do anything to 16-bit scans, hence this is not a useful file format in the HDR application for original grayscale images.

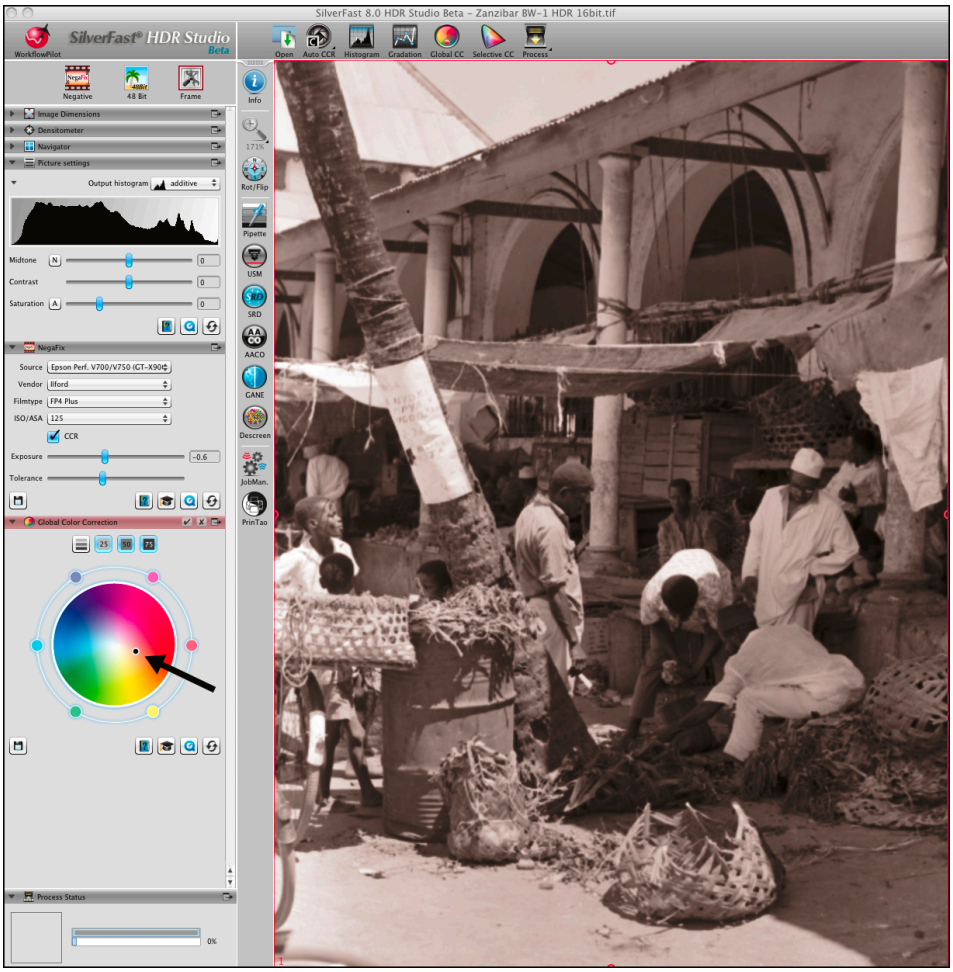


Figure A4.6 16-bit Image Tinted in SilverFast HDR 8

Turning to tinting the image in Lightroom (in this case Lightroom 4.0 using Process 2012), scan the image as a 16-bit TIFF file and open it in Lightroom using either of the approaches explained in Chapters Two and Ten.

Two "value-added" features in Lightroom that make this an interesting alternative are that you can work in **Softproof** mode and you can **split Tone** the image. **Softproof**, once you set it up with the correct printer/paper profile and assuming that your display is properly calibrated and profiled, gives you a very good on-display rendition of what the printed image will look like. **Split Toning** allows you to implement different tints on highlight versus shadow areas and to finely adjust the switchover values between the two tints in the mid-tones (Figure A4.7, where I used a very slightly warmer hue in the Shadows than in the Highlights).

Figure A4.7 Softproofing and Split-Toning a 16-bit SilverFast Scan in Lightroom 4.0

Use of Multi-Exposure

Recalling that this is a negative scan, highlights are dark and shadows are light. **Multi-Exposure** adds exposure to the dark parts of the media, which improves highlight rendition in the eventual positive. Looking carefully at Figure A4.8, one can perceive a subtle improvement of tonal differentiation in the highlights (especially the sloped roof by the sky), and overall a slightly "snappier" outcome. While the effect here is not large and varies from image to image, leaving **Multi-Exposure** active only increases scan time moderately, while it helps mitigate scanning artifacts and provides a small incremental benefit to image luminance; hence I recommend generally leaving it active.

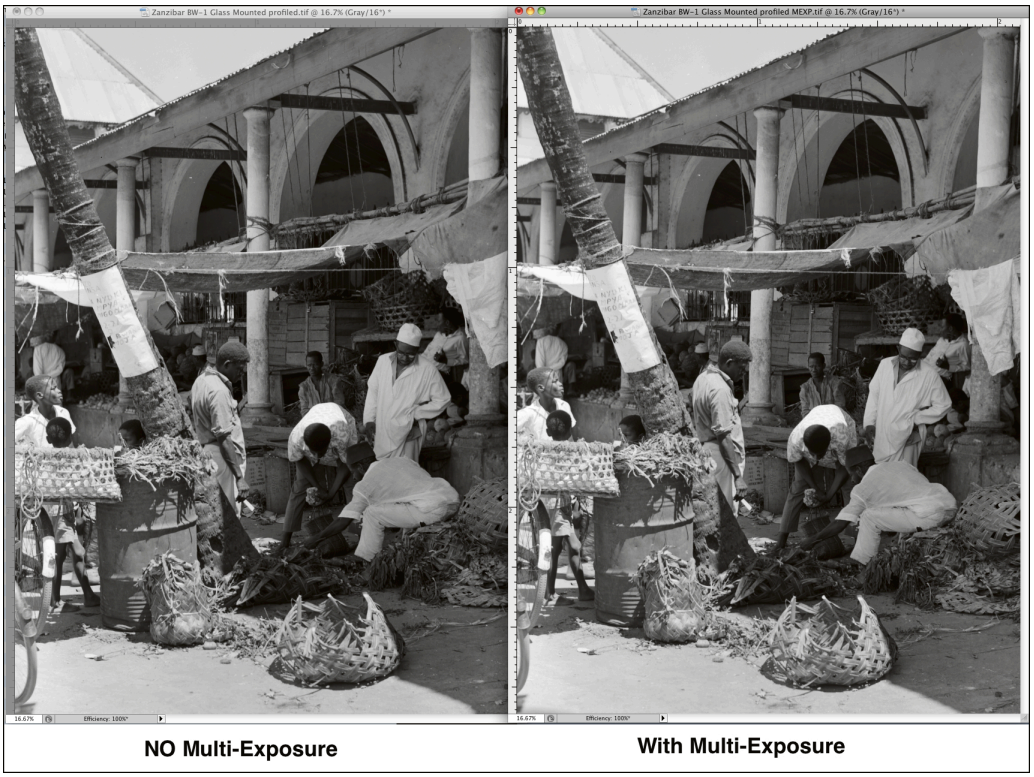


Figure A4.8 Without vs. With Multi-Exposure

Use of Negafix

Negafix reverses negative to positive. As well, selecting the correct **Negafix** Profile contributes to improved image tonality (Figure A4.9).

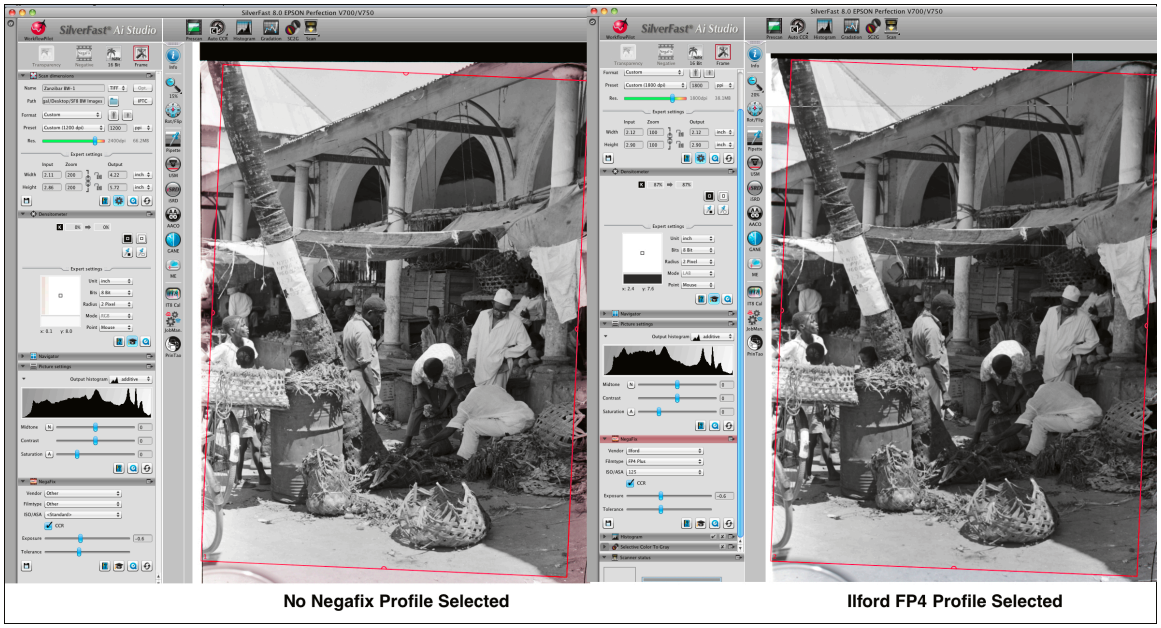


Figure A4.9 No Negafix (left) vs. Correct Negafix Profile (right)

The right-hand image of Figure A4.9 with the correct **Negafix** profile (Ilford FP4) exhibits subtly better tonal gradation than the left-hand image, which uses an unspecified profile. The highlights are somewhat tamed and the mid-tones not overly bright in the right image compared with the left. Hence I recommend scanning with the appropriate **Negafix** profile.

But that's not all we can do with **Negafix**, especially if you have the **Ai Studio** version, which provides the **Negafix Expert** tools (**Curves** and **Expansion**). While **Expansion** is meant for fine-tuning colour balance in highlights and shadows (Chapter Nine), it can also play a useful role for normalizing histograms with Grayscale images. This is something "you saw here first".

It so happened that the default rendition of this image preview shows a modest amount of highlight clipping (Figure A4.10 red oval). Looking to the left side of the Figure at the **Negafix Expansion** panel, we do indeed observe that the three channels (a 16-bit scan, but this information shows) exhibit a slight bit of clipping.

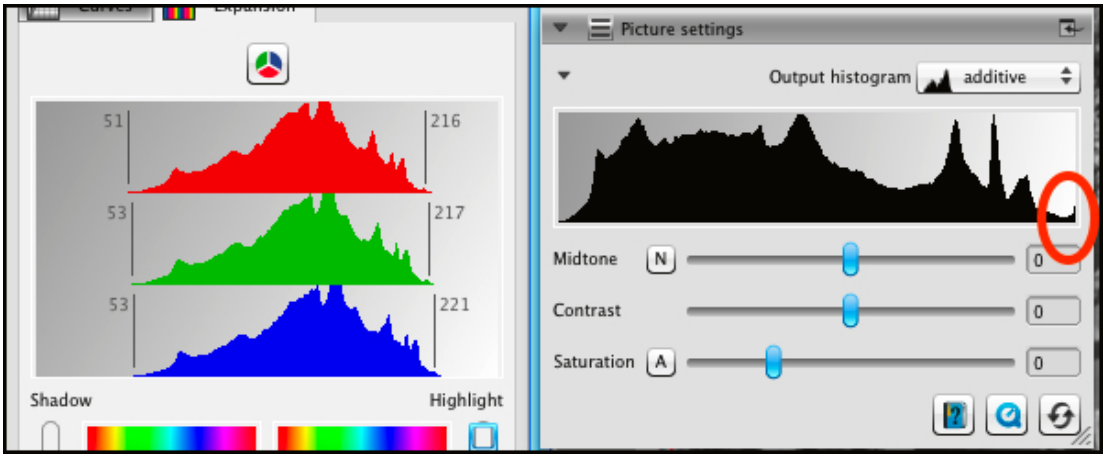


Figure A4.10 Highlight Clipping in 16-Bit Scan Preview

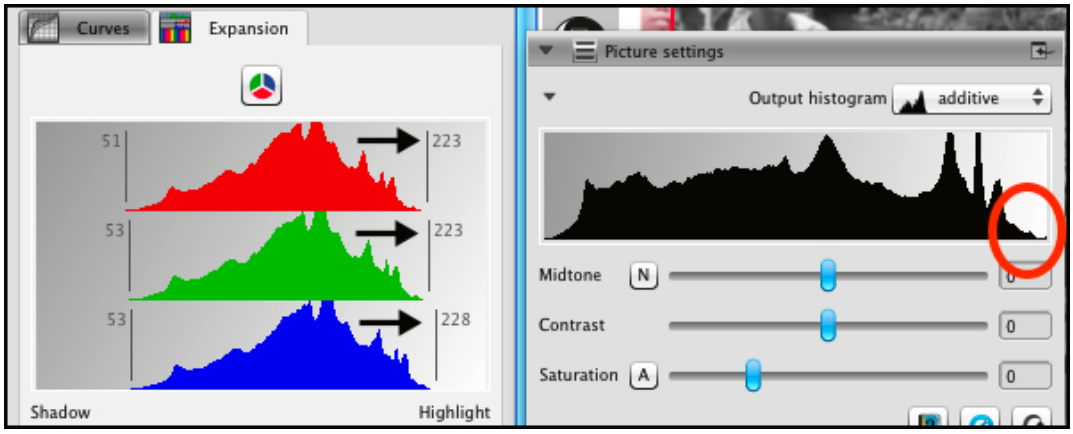


Figure A4.11 Histogram Normalized with Expansion Panel Tool

I fix this by pushing the highlight bars slightly rightward (Figure A4.11, black arrows) so that the highlight tails of the histogram are included in the image, and not clipped (compare the shape of the histogram within the red oval of Figure A4.10 and A4.11, where in the latter tones are normally distributed, while in the former they are "bunched" against the right wall, indicating highlight tone suppression). I remind that this kind of adjustment should be done in the scanning software, because once you scan an image with clipped highlights, the clipped information is lost. Users of SF8 **SE** and **SE+** can shift the **Tolerance** slider in the Negafix panel leftward to partly achieve the same result. It may not necessarily do so completely, depending on the image. For this image, even with **Tolerance** at a minimum, minor adjustment with **Expansion** was needed to complete the task.

Post-Scan Workflow

I have already discussed above several aspects of post-scan workflow in SilverFast HDR, Photoshop and Lightroom. As I've mentioned elsewhere in the book, the main editing tools for luminance and colour are available in all the covered applications; however, the manner in which they work and the results they produce differ. Which you use is partly a matter of taste, what your objectives are and how much software you equip yourself with.

I'm looking for the easiest way of getting the best tonal rendition I can from a film scan, whether it is in colour or grayscale. My research on "best practice" for scanning grayscale negatives takes me to a workflow beginning in SF8 and ending in Lightroom 4.0 **Process 2012**. SF8 can produce a very fine scan that makes an excellent starting point for the state-of-the-art luminance adjustment tools in Lightroom 4.0 using **Process 2012**.

To achieve the result of Figure A4.12 overleaf, starting in SF8, the key steps were:

- Select high enough scan dimensions and resolution to suit the purpose (e.g. large print);
- Select the **16-bit TIFF** file format for assuring neutral grays and maximum scanned luminance values;
- Select **Multi-Exposure** to maximize highlight information and minimize scanning artifacts in the scan;
- Make sure the histogram is normalized as needed, using the **Expansion** tab in Negafix (**Ai Studio**; **Tolerance** in **SE+** and **SE**), as well as any mid-tone exposure adjustments that may be appropriate.

Then import the image to Lightroom 4.0, enter the **Develop** Module and select **Process 2012** in the bottom right panel of the interface. In the case of Figure A4.12, because I attended to the exposure in SilverFast, the exposure, once opened in Lightroom looks generally satisfactory and the histogram is normalized as intended. However, where Lightroom shines for an image like this is in the fine-tuning of highlights and shadows.

A4.12 SF8 Scanned with Final Adjustments in Lightroom 4.0 Process 2012

This is a complex image to adjust satisfactorily, because the highlights are easy to blow, yet they contain useful information, the shadows are easy to block, yet they contain lots of interesting detail, and the mid-tones can be easily compromised by insufficiently targeted adjustments to highlights and shadows. This is where **Process 2012** in Lightroom has its comparative advantage, and most of the action is in the **Basic** panel. By reducing both **Highlights** and **Whites** I tamed the highlights to reveal more detail (for example, the pattern on the shirt of the man bending forward) without excessively flattening them. By opening **Shadows** and increasing **Blacks**, I improved the visibility of shadow detail (for example, the boxes and baskets under the canopy) while maintaining good contrast in the shadows, so they don't look like muck. Meanwhile, the mid-tones, which were generally satisfactory to start with, are not affected by these adjustments. Looking over the image as a whole, I introduced a very slight "S" to the **Tone Curve**, to give overall contrast a very slight boost. To my taste (others may well prefer other adjustments), this image is now ready for print, and demonstrates the synergy between SF8 and the very best of the external editors.

Appendix 5

The Challenge of Shadow Detail

What's the challenge?

Many of our transparencies, and it is claimed by some – Kodachrome in particular, are "contrasty" and prone to blocked-up shadows, to the effect that shadow detail is a challenge to both unearth and represent in a pleasing photographic manner. The "pleasing photographic manner" is that shadows are brightened sufficiently to reveal the detail they contain, but with sufficient contrast within the quartertones so that they don't look like dull gray or brownish "muck". The challenge is two-fold: firstly to scan the media in a manner that retains whatever shadow detail the slide may contain, and secondly to target the processing for shadow luminance in a manner that makes it "pleasing" without washing-out the remainder of the image.

There are numerous ways of doing this, possibly involving more than one application. The process of course always starts with the scan, but may continue and end in different imaging applications. The purpose of this Appendix is to demonstrate a range of options using a very challenging image, much in the spirit of Chapters Two and Ten, where I start with SF8 alone, and then combine it with Photoshop or Lightroom. As usual, the initial conditions at the scan stage bear heavily on what can be done with the image in a post-scan workflow, therefore how we set-up the scan in SF8 is important.

Figure A5.1 shows the "raw material" being worked with before making any adjustments to anything. I think I shot this with a Kodak Retina IIa.

Figure A5.1 Initial Scan – No Adjustments; Kodachrome, Bruges, 1958

The main items of interest are the dense shadow areas outlined with red ovals. The left wall has a lot of branch and brick texture; the underside of the bridge has reflections of water from the canal it crosses and the wall of the canal (lower right corner) does have a limited amount of tonal variation in the original media – it isn't simply a black blob. The area in the yellow oval is less dense, and contains more obvious detail without further adjustment, but it can improve as a by-product of what one does with the red-oval areas.

The first item of business at the scan stage in SF8 is to see what difference it makes to both areas by activating **Multi-Exposure** (Figure A5.2).

Figure A5.2 Initial Scan with Multi-Exposure

The answer, when using a high-end scanner with superior dynamic range is often "very little" – but for scanners with lower dynamic range, an extra shot of exposure in the scanner would make more of a difference in terms of how much light passes through the denser media tones to the sensor. It makes sense to leave **Multi-Exposure** active in case its impact would be improved when combined with any of the other measures discussed below; hence, I have done so.

The mid-tones and highlights need some brightening-up, as shown below by the concentration of tones toward the left side of the histogram. Hence the next order of business is to "normalize the histogram", which in this case means, in SF8, remapping the highlights to fill the tonal range, at the same time increasing contrast (Figure A5.3, red arrow).

Figure A5.3 Normalized Histogram Improves Brightness and Contrast

This change of course did nothing for the shadows, but made the rest of the image quite satisfactory. Hence the remaining operations on the shadows should preserve the quality of the midtones and highlights as much as possible.

While in the Histogram Panel, **Expert** settings, one could try to lighten the shadow areas by raising the black point of the histogram (Figure A5.4, red arrow).

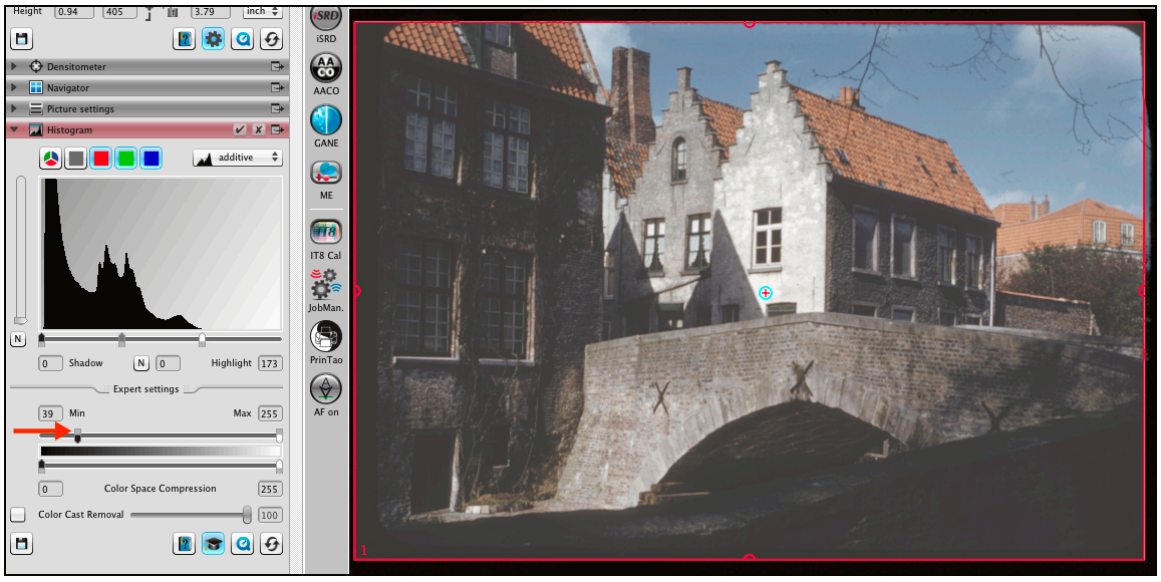


Figure A5.4 Adjust Histogram Black Point in Expert Settings

As you can see, this is a bad idea for such an image, because while it reveals a bit more shadow detail, the shadow areas turn "muddy" and the rest of the image weakens considerably. This, by the way, includes **Multi-Exposure**, for which the **Multi-Exposure Preview** is active (**Preferences>Special**).

Still within SF8, we have a better option, which is to brighten and steepen the quartertone portion of the **Gradation Curve** (Figure A5.5, red arrows).

Figure A5.5 Adjust the Quartertone Portion of the Gradation Curve in SF8

This is a major improvement over the previous images insofar as more detail on the left wall and under the bridge begins to show, although it does weaken the mid-tones a bit more than I would consider ideal. It demonstrates the limitations of tone curves for this kind of task, insofar as the quartertones can be lifted only so much before excessive brightening and flattening of tones just above the quartertones would overly weaken the remainder of the image. This can be improved using a "lock-down" technique for the remainder of the curve, but then care is needed to assure that tonal transitions don't become too abrupt between the adjusted and locked-down portions of the curve, otherwise the image can be "posterized".

Given the well-known limitations of tone curves for dealing with deep shadow detail, SF8 has another tool called **AACO** (Chapter Seven) – **Auto Adaptive Contrast Optimization** – designed to help reveal shadow detail, while minimizing impact on highlights. This is a tool that must be used with great care, because even moderately overdone adjustments can quickly muddy-up the image. Handled with considerable moderation, it can contribute to improved shadow detail in a difficult image like this one (Figure A5.6). The sliders have been set bearing in mind the instructions provided in Chapter Seven for the use of the tool and the note of caution here about over-use. You can see in the illustration that shadows have been lightened, but even with the modest adjustments made here, we begin to see evidence of moderate muddiness. Had I pushed these adjustments further, I could have opened the shadows more, but the collateral damage in terms of muddy shadow appearance and weakened mid-tones would have become more apparent.

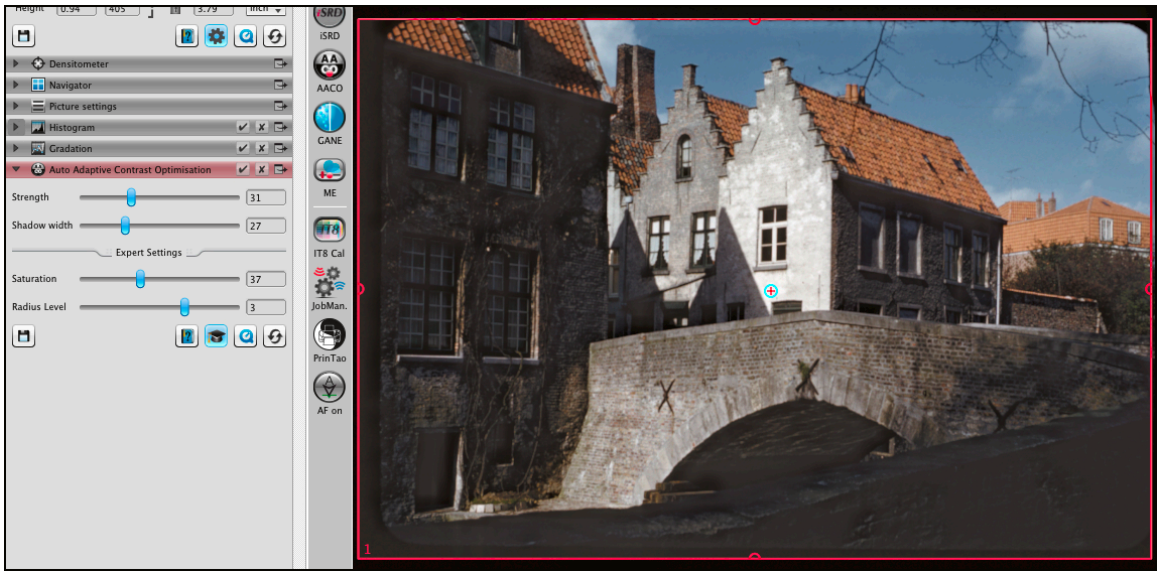


Figure A5.6 Use of AACO to Lighten Shadows

The foregoing essentially exhausts the range of quartertone adjustments I could implement in SF8. Combining **Gradation** and **AACO** adjustments excessively weakened the midtones and highlights.

I then decided to scan the version of the image in Figure A5.3, and tried to improve the quartertones first in Photoshop, then in Lightroom, independently – i.e. not one application building on the other.

First, a note on the scan: I did it at 4000 PPI, 48 bit and insured there was no histogram clipping of either highlights or shadows. For colour management I used ProPhoto as the working space and a custom scanner profile for Kodachrome, made using the **SF8 Auto-IT8** profiling tool. It created a profile that reproduces Kodachrome hues very satisfactorily[1]. This way I know that I would be feeding into the external editor as optimal a scan as SF8 and my Nikon SC-5000-ED could deliver.

Editing the quartertones in Photoshop

One's first instinct may be to head for the Curves Adjustment Layer and implement a curve strategy similar to that I tried with some success in SF8. It does as well, and suffers the same limitations. Of course Photoshop has tools one won't find in any scanning software, such as Blend Modes. I could mask-in the shadows on separate layers and use a combination of Screen Mode and steep tone curves to open the shadows and give them appropriate contrast. This is a lot of painstaking work, so I would prefer more efficient and elegant solutions. Over the years, Adobe has much

[1] I tested the quality of the profile using the procedure described in Appendix 3, and visually confirmed that the colours of the image in Figure A5.3 closely resemble those in the original slide.

improved the Shadow-Highlight tool, to an extent one can now say in all honesty – it's "pretty good" – in the sense of improved targeting and less collateral damage compared with how it performed when it first became available. That said, I caution users that care is needed not to overdo it, otherwise it would incur risks similar to SF8's **AACO**. Used appropriately, however, one can expect truly decent results (Figure A5.7).

Figure A5.7 Use of Shadow-Highlights in Photoshop CS5

"Appropriate use" here meant keeping the **Tonal Width** and **Radius** very low and pushing the **Amount** quite high, essentially targeting a strong adjustment over a narrow range of quartertones. You can see revealed in this result much more detail in all the shadow zones than available from any of the foregoing strategies, while contrast throughout the image remains strong and appealing.

Editing the Quartertones in Lightroom 4.0, Process 2012[2]

Interested to see whether Lightroom could yet improve on the Photoshop outcome, I imported the original scan of Figure A5.3 into Lightroom 4.0, selected **Process 2012** in the bottom right panel of the **Develop** module, then went back to the top of the panels and worked with the new **Basic** tools (Figure A5.8).

[2] **Process 2012** is the revised **Develop** engine in Lightroom 4. Users of Lightroom 4 may select **Process 2010** if they wish to remain with the Lightroom 3 **Develop** engine. Having used **Process 2012**, I won't go back.

Figure A5.8 Shadow Detail Adjusted in Lightroom 4.0, Process 2012

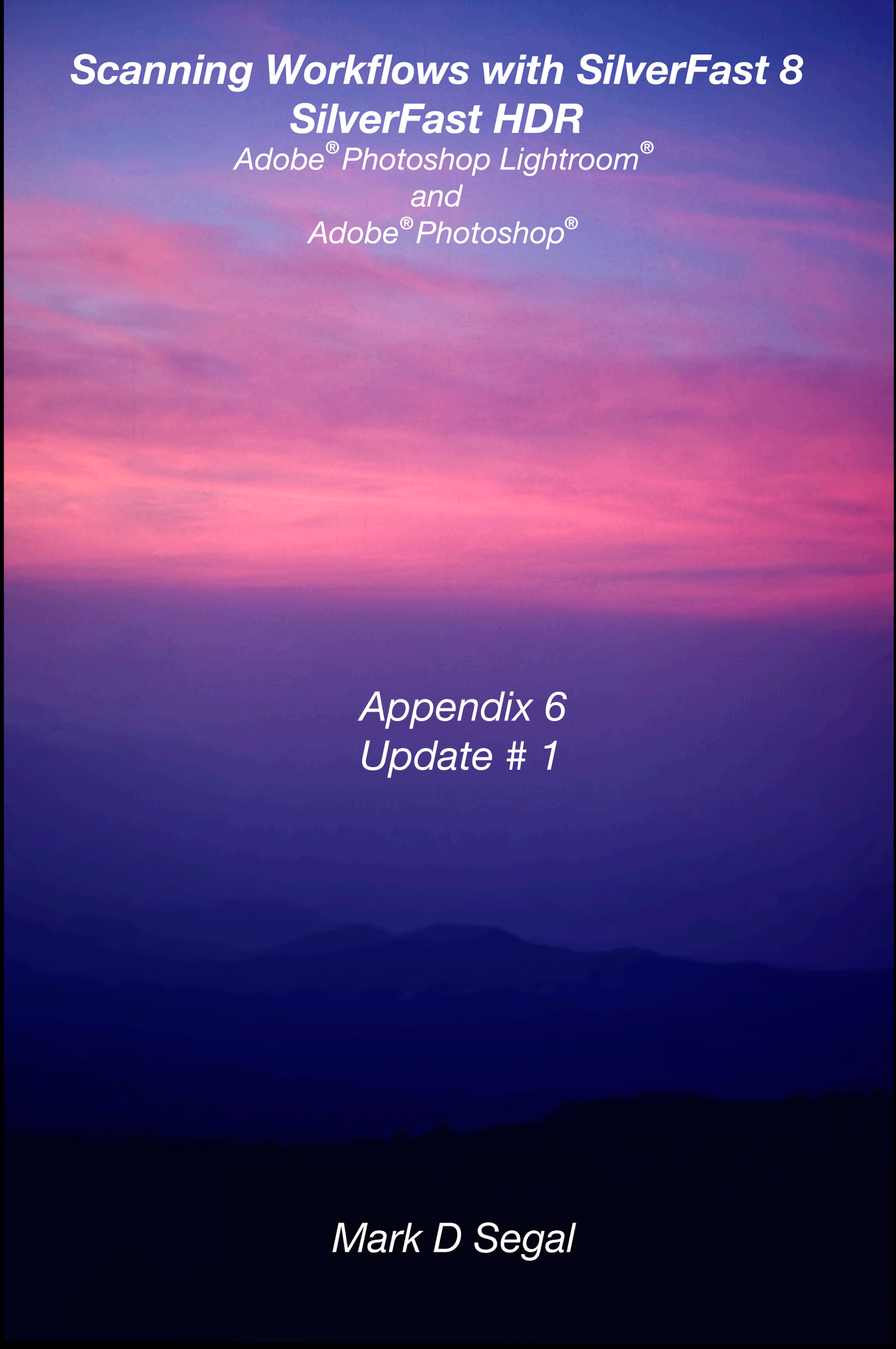
The adjustment strategy here was very straightforward. Because the basic exposure and contrast in SF8 were good, there was no need to adjust either **Exposure** or **Contrast** in Lightroom. This image really needed only two major adjustments in Lightroom. I boosted **Shadows** to a level of 83 (out of 100 maximum) and cut a bit of glare from the highlights (the light gray building façade in the center) by reducing **Whites** (which has much less impact on highlights overall compared with adjusting **Highlights**), and therefore better targets the objective).

My judgment is that this is clearly the best rendition of this image I've been able to achieve, and so easily. The richness of detail in the left wall and under the bridge, and the improved tonal separation in the front right canal wall (bottom right corner) are superior, while the mid-tones and highlights remain very pleasing. Looking at Figure A5.1 you may never have suspected that the scan actually picked up so much quartertone detail. But the film contains it, and between the two applications I retrieved it to a high level of overall image quality.

As I concluded in Appendix 4, this sequence of SilverFast 8 to Lightroom 4.0 can be a very rewarding combination, and I recommend it as a sound and convenient workflow.

Scanning Workflows with SilverFast 8
SilverFast HDR

Adobe® Photoshop Lightroom®
and
Adobe® Photoshop®



Appendix 6
Update # 1

Mark D Segal

Scanning Workflows with SilverFast 8 - Update #1

Introduction:

Since the completion of "Scanning Workflows with SilverFast 8, SilverFast HDR, Adobe Photoshop Lightroom and Adobe Photoshop" in Q1 2012, LaserSoft Imaging has released several application updates containing new or amended features. The purpose of this update is to provide instruction on these new items. The update is provided free of charge as part of the service to customers who bought or will buy the book. Not every update applies to every scanner version; therefore if you find an item mentioned here not available in the latest download of SilverFast 8 for your scanner, it means the feature is not applicable to that scanner model. This update is based on SilverFast 8.0.1r14 release.

1. Ending Workflow Pilot:

If you wish to exit Workflow Pilot Mode at any point during the process of using it, you may do so by clicking on the blue WorkflowPilot icon in the upper left of the application interface (Figure u1).

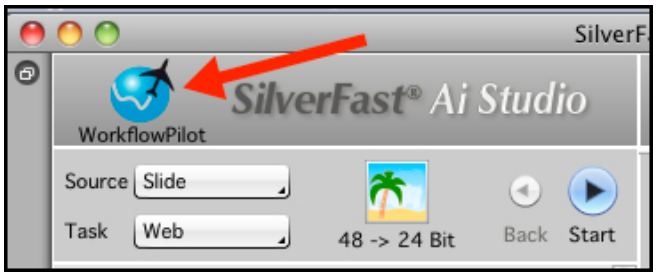


Figure u1.1 End Workflow Pilot

2. Font Size Increased:

LSI has increased the font size of text in the GUI from 9 point to 11 point. People with high resolution displays will especially appreciate this improvement. There is nothing you need do about this other than enjoy the improvement!

3. Photoshop CS6 Support Added:

LSI has made the application compatible with Photoshop CS6 for importing images from SF8 to CS6. SF8 remains backward compatible with earlier versions of Photoshop.

4. Output Rotate/Flip Added to the Densitometer:

The Densitometer now has two modes: it can measure the colour values of pixels, and it can be used to rotate or flip the output orientation of the image without

affecting the position of the large monitor preview. This feature exists in the "Expert" settings, activated by the column of buttons to the left of the window in the Densitometer "Expert" panel Figure u1.2).

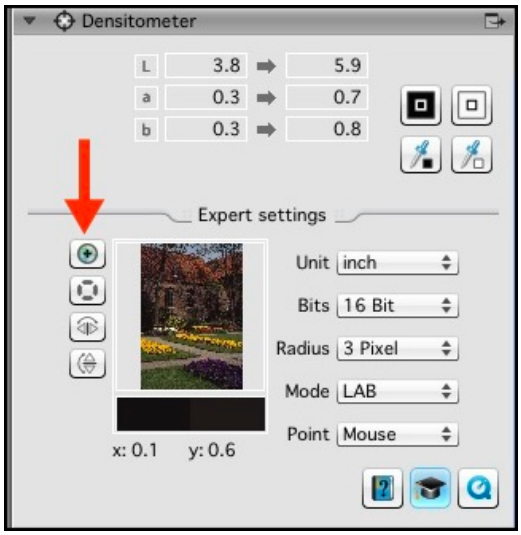


Figure u1.2 Output Rotate/Flip Controls

The top button (red arrow) is a toggle switch that enables the rotating and flipping action to be triggered with the three buttons below it. To initiate a rotate or flip, toggle this top button. It turns into a "radio button" and the black swatch in the center of the dialogue turns into a preview of the output image (Figure u1.2).

Each click of the second button rotates the images 90 degrees clockwise. The effect appears in the Densitometer dialog window as it will appear in scanned output (Figure u1.3, red arrow, one 90 degree rotation), without however changing the orientation of the image in its prescan state in SF8 (**Navigator** and **Prescan** views).

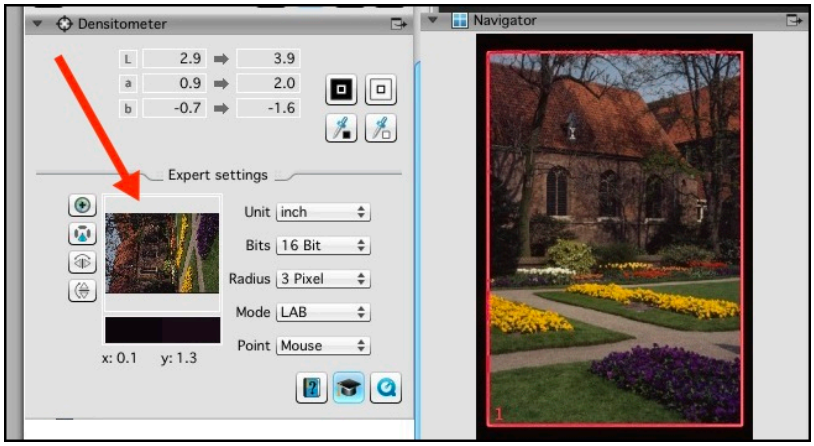


Figure u1.3 90 Degree Output Rotation

Each click of the third button flips the image horizontally, while each click of the fourth button flips it vertically.

Gradation Tool Dialog:

The **Brightness** slider has been removed and replaced with a **Midtone** slider. The value in the dialog to the right of slider is 0 when the curve is linear. Shifting the slider leftward darkens the image and shifting it rightward brightens the image. It can be shifted to -30 going leftward and +30 going rightward (Figure u1.4 overleaf)

The **Midtone** slider is also correlated with the **Midtone** slider of the **Output Histogram** in the **Picture Settings** panel. Both have the same scale and produce the same effect.

It is also correlated with the middle slider of the **Histogram** tool, which is an input histogram. The span of this slider also always measures from -30 to +30.

Figure u1.4 shows that you can produce exactly the same midtone adjustment by adjusting the middle slider to the same numerical extent in all three tools: Gradation Curve, Histogram and Picture Settings.

There is, however, at least one very important distinction to be made in the case of the **Histogram** tool (the input histogram – the one sitting just above the tone curve in Figure u1.4)), as this is the only tool in SF8 that allows you to remap the white and black points in order to "normalize" the image's contrast and brightness range[1].

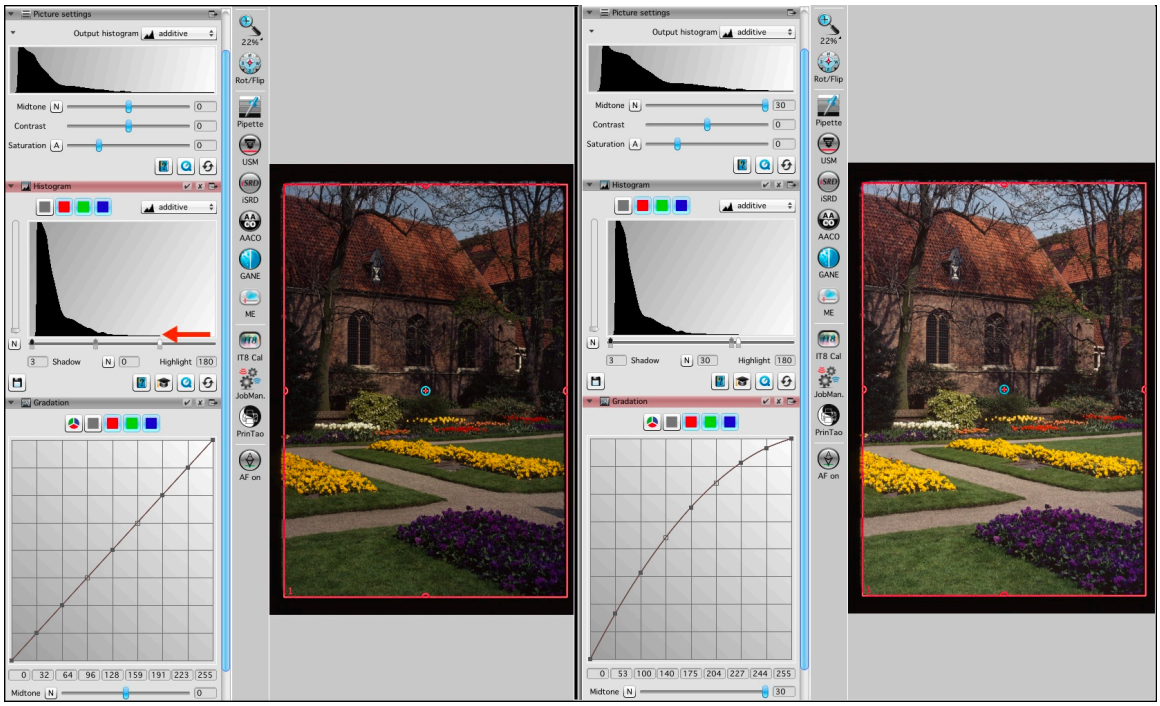
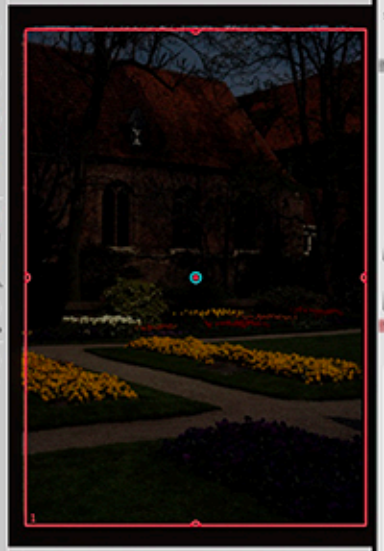


Figure u1.5 Normalizing the Histogram(left) and Added Midtone Brightness (right)

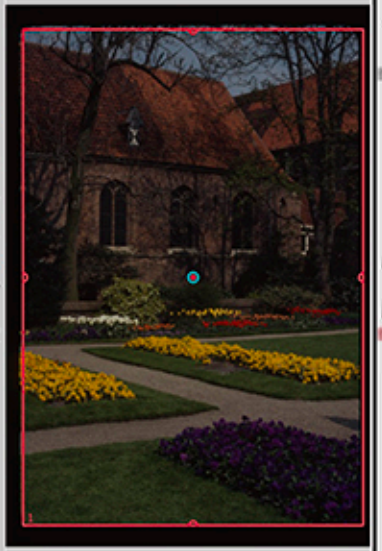
[1] The concept of normalizing the histogram is explained in the book.

Dark Curve; Value = -30



All midtone sliders far left

Linear Curve; Value = 0



All midtone sliders centered

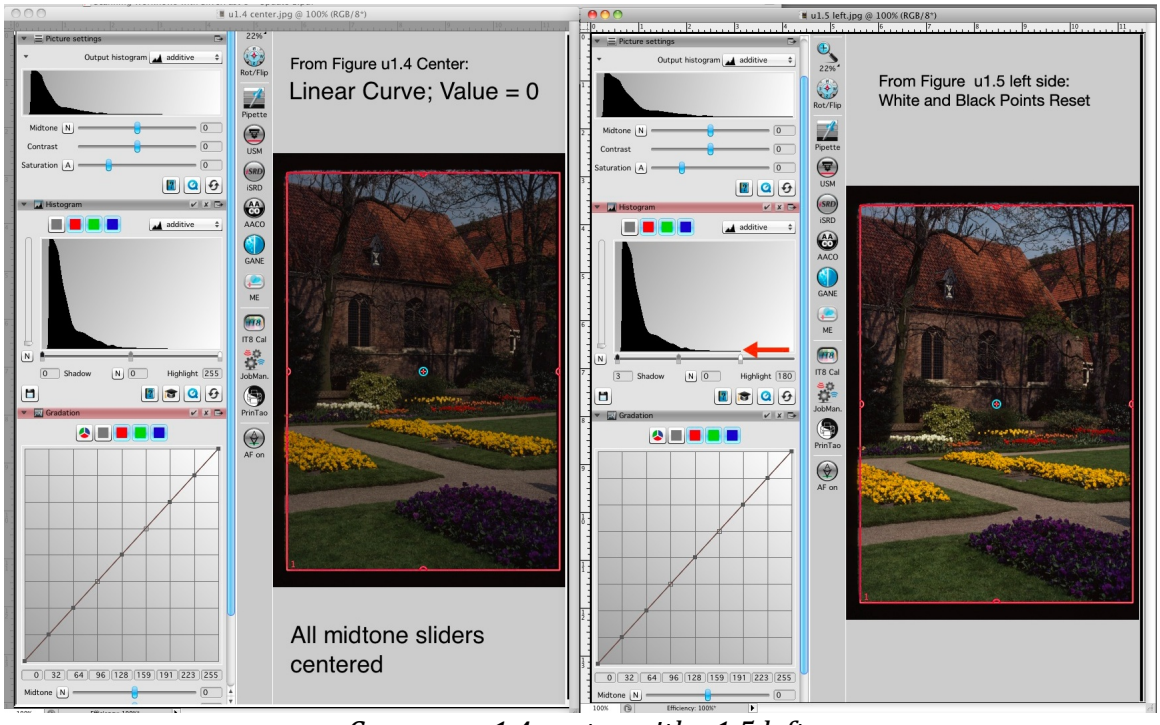
Bright Curve; Value = +30

All midtone sliders far right

This image provides a good demonstration of why this is important. The scan preview emerged dark relative to the appearance of the Kodachrome slide[2].

The most telling cause of this outcome is the fact that the whitest point in the image (the white flowers by the church wall) sits well below the upper limit of the tonal range (value=255). In fact, it is at level 179, because if I remap the white point (right-most **Highlight** slider in the **Histogram** tool) to level 179 (Figure u1.5, left side, red arrow), the histogram remains unclipped and the brightness and contrast is much improved. Contrast is improved yet further by remapping the black point (left-most **Shadow** slider in the **Histogram** tool) from level 0 to level 3.

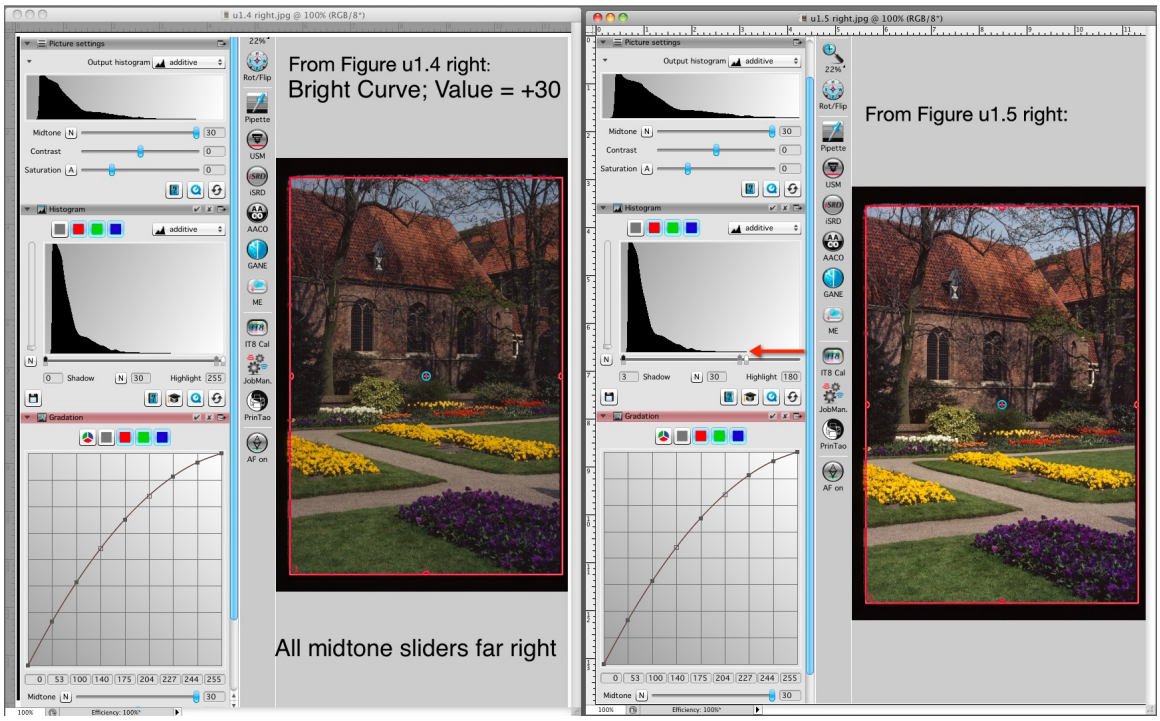
You can see the overall result of simply resetting the white and black points (without clipping the histogram) comparing the left photo in Figure u1.5 with that of the middle panel in Figure u1.4. The midtone adjustment in Figure u1.5 left image remains at zero in all three of the tool panels (as it is in the middle panel of u1.4), but brightness and contrast improved by normalizing the histogram (resetting the white and black points to better portray the tonal range of the original image). The comparison of figures u1.4-center and u1.5-left is shown for convenience in the illustration immediately below, where the left side shows no midtone adjustment and no white and black point reset, and the right side shows only the result of resetting the white and black points, also leaving midtones unadjusted:


From Figure u1.4 Center:
Linear Curve; Value = 0
All midtone sliders centered
From Figure u1.5 left side:
White and Black Points Reset

Compare u1.4 center with u1.5 left

[2] I suspect because white point of the scan is below the whitest point of the slide.

Now here's the relevance to the **Midtone** slider in the **Gradation** tool: having normalized the white and the black points in the **Histogram** tool, which remaps the tones to sit within a narrower range, if you now proceed on top of that to make **Midtone** adjustments in the **Gradation** tool, even though the numerical value of the adjustments will always remain within the range of -30 to +30 in all three tool panels, the effect of this shift is fully contained within the narrowed tonal range of the image as set in the **Histogram** tool, and the luminance impact on the image is compounded, because it is being applied to an already adjusted (brightened) tonal range. You can see this difference comparing (for convenience, reproduced just below) the right panels of Figures u1.4 and u1.5, where u1.5 right is brighter than u1.4 right, even though both have the same **Midtone** adjustment to a value of +30.



Compare u1.4 Right with u1.5 Right

The workflow implications emerging from this set of comparisons are simply this:

- Firstly, normalize the histogram by setting the white and black points to appropriate levels without clipping the histogram end-points, unless you wish to clip them on purpose for special effects.

- Secondly, adjust the midtones, using either the **Midtone** slider in the **Gradation** panel or the middle slider under the input **Histogram**[3].

We aren't finished here yet – because SF8 has another very interesting graphic effect controlled through the amended **Gradation** panel. Go to the bit depth

[3] You could also use the **Midtone** slider in the **Picture Settings** panel.

selection icon (Figure u1.6 left side, red arrow) and convert the image to the format **16 -> 1 Bit** (Figure u1.6, green arrow). This makes every pixel either black or white, depending on its underlying luminance level.

In this image mode, the gradation curve becomes a threshold adjustor, determining the level of luminance at which a pixel converts to either black or white. You can produce some visually appealing artistic effects with this. The start position in the left side of Figure u1.6 looks rather uninformative – largely a black box.

But by dragging the **Threshold** slider to the right, lighter pixels are brightened and depending on how light they become, they convert to white, leaving the remainder black. In this example, I moved the **Threshold** slider rightward to a value of 85 and the result is an interesting "wood-block print" effect of the church image (Figure u1.6, right side). Had I moved the slider further to the right, more pixels would have turned white. The slider is the only available control over this curve shape. The position of the curve points cannot be changed manually.

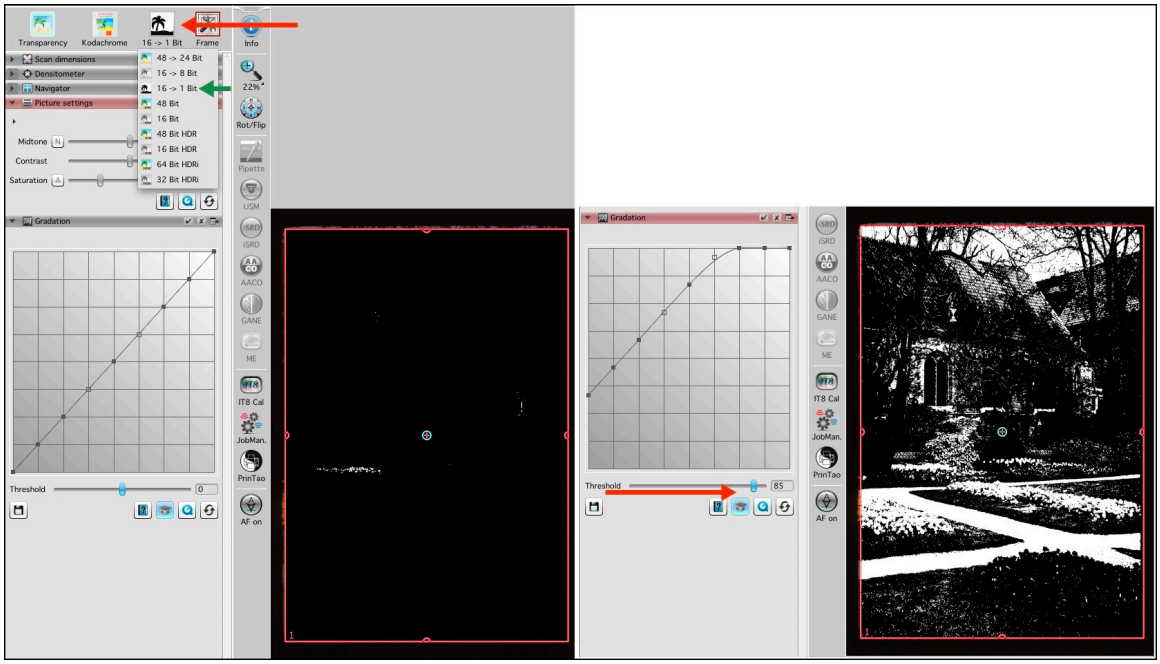


Figure u1.6 Threshold Adjustment for 1 Bit Output

Analog Gain:

While on the subject of luminance, let us cover **Analog Gain**, otherwise known as "lamp control". This control is available only for supported scanners, for example the Nikon 5000. It is found in **Preferences > Special** (Figure u1.7, red arrow). Click on the button by the red arrow and a dialog will open (Figure u1.7, lower-right inset).

The default position for each slider is "0" and they can each move within a range of +20 to -20. Because this is a hardware-dependent adjustment, its effect can be seen only after shifting the slider and committing to a new prescan. After you shift a slider to any non-zero position, a dialog (Figure u1.8) appears. Click **Yes** and the image will be prescanned, showing the effect.

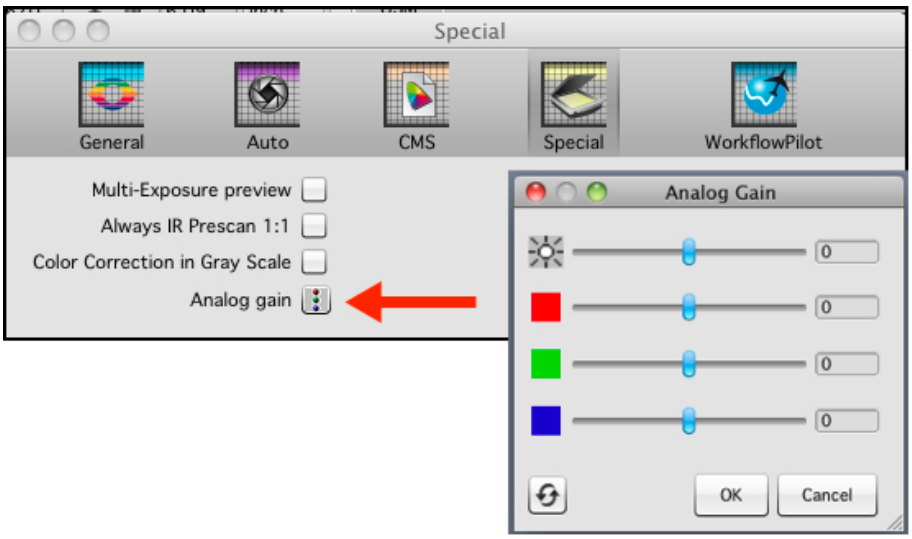


Figure u1.7 Analog Gain Controls

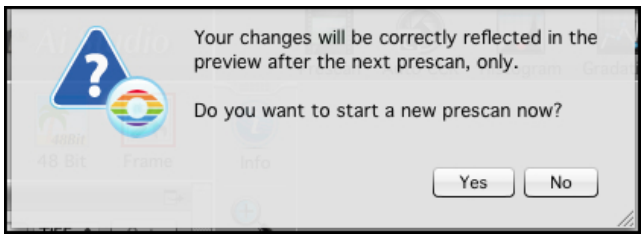

Your changes will be correctly reflected in the preview after the next prescan, only.
Do you want to start a new prescan now?
Yes
No

Figure u1.8 Analog Gain Prescan Advisory

The overall impact of this adjustment is rather limited, as shown in the comparison of Figure u1.9, shifting the neutral brightness slider (top one, bulb icon) from -20 (left panel) to +20 (center panel). The main change from 0 to +20, for example, shifts the right toe of the histogram from level 179 to level 184.

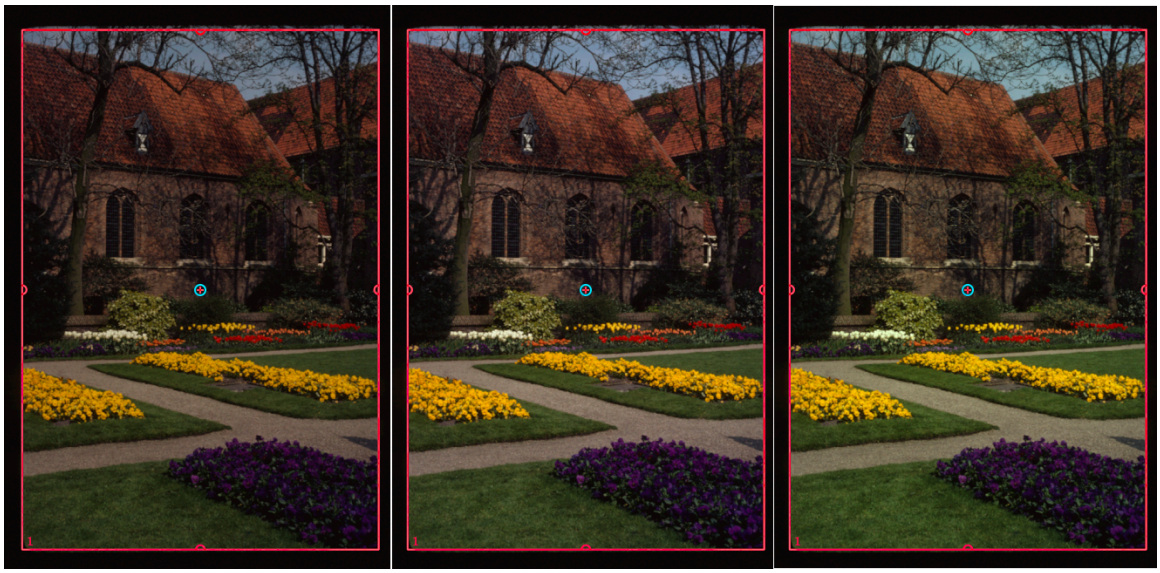


Figure u1.9 Brightness and Colour Adjustment Range of Analog Gain

The individual color channel sliders below the top one are for adjusting the brightness of each channel independently. You want to be careful with these, because they alter the colour balance of the image, as you can see by my having moved the Green channel slider from 0 to +20 (Figure u1.9, right panel). Notice how the sky now has a cyan cast and the path has changed from brownish to greenish, while the grass is brighter green and the yellow flowers are less orangy. The church wall has also shifted from reddish-brown to greenish-brown.

Because this adjustment is made in **Preferences**, it is sticky until you change it and will remain sticky at the value of each subsequent adjustment until changed. Hence it's use is recommended if you think most of your images need a systemic, generalized adjustment to a uniform extent. For example, if I think my scanner is systematically delivering darker output than I think it should, increasing the neutral analog gain may help to systematically mitigate this issue, but only a little.

Always IR Prescan 1:1

While in **Preferences>Special**, there is one more newcomer: **Always IR Prescan 1:1** (Figure u1.10, red arrow). Checking this option will cause the scanner to systematically make a 1:1 preview scan for the infrared channel with every image pre-scanned while this option remains checked. As explained in the book, a 1:1 prescan is needed to use iSRD. The iSRD panel has a **1:1 Preview** command that needs to be triggered with every image, unless you have preselected this option as shown here in **Preferences>Special**. I find this a useful preference to activate, because most images need some amount of cleanup with iSRD.

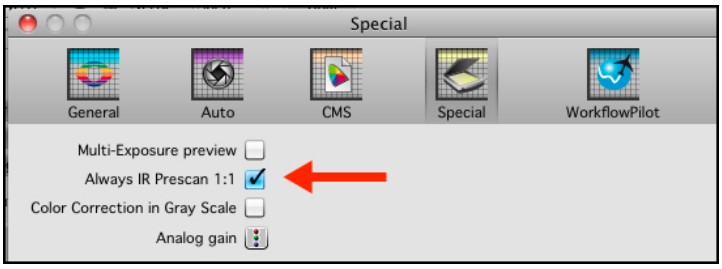


Figure u1.10 IR 1:1 Prescan Preference

Show Image After Scan

In **Preferences>General**, if you check the box beside **Show image after scan** (Figure u1.11, red arrow), every time you make a scan, the output image will open in the chosen external image editing application. You select this external image editing application by clicking on the "…" button (Figure u1.11, green arrow) and from the drop-down menu select your preferred application (NOT the application folder, but the application itself – "**.exe**" in Windows, or "**.app**" in Mac). If you wish to cancel these selections and revert to SilverFast defaults, click the button under the blue arrow in Figure u1.11.

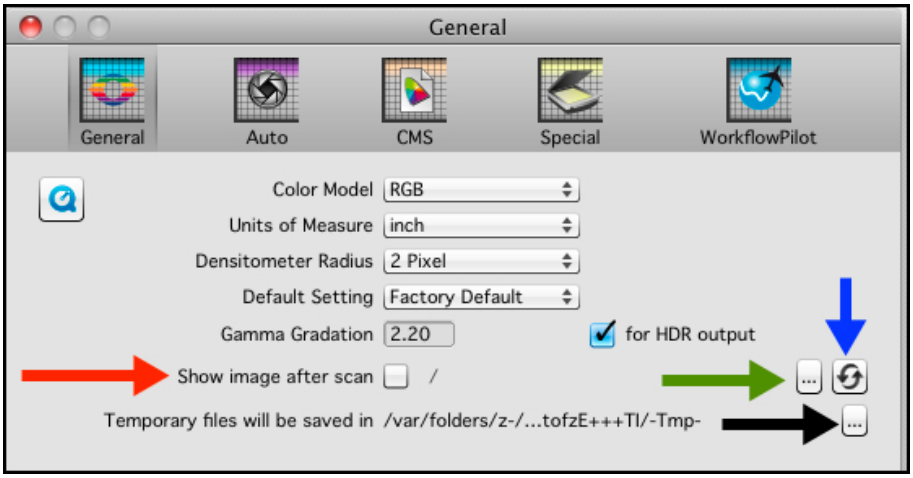


Figure u1.11 Show Image After Scan

Temporary files will be saved in…

Again in **Preferences>General**, the bottom line allows you to select a drive space in which to store SilverFast's "temp files", by clicking on the "…" button (Figure u1.11, black arrow). This pulls up your Finder (Mac) or Explorer (Windows) allowing you to migrate to a folder where these "temp files" will be stored. This is akin to the "scratch disk" function of Photoshop, providing for the handling of RAM overflow. If you have more than one hard drive inside your computer, the usual recommendation is to use a drive that is not the system drive for the scratch disk. This way both drives can work independently, improving operational efficiency.

Auto-renaming with Job Manager

Batch scanning using **JobManager** is explained in the book. The added feature (which existed in SilverFast 6.x) is the ability to batch-rename images and have them sequentially numbered as they are scanned. The **step-by-step** implementation is as follows, for this demo - using the Epson Perfection V750 Pro scanner in slide transparency mode.

1. You need to be using the Ai Studio version of the software in Manual mode (red globe in the upper left corner of the interface).

2. Click the **Frame** button (Figure u1.12, red arrow) and in the dropdown menu that opens click **Find frames>35mm film holder**.

3. After making any custom adjustments to any of the images and you are ready to batch-scan them, click on the **JobManager** icon in the tool column (Figure u1.12, green arrow). This will open the **JobManager** dialog (Figure u1.13). You will see all of your selected images lined-up in the column, with the name **Image 1**, **Image 2**, …etc.

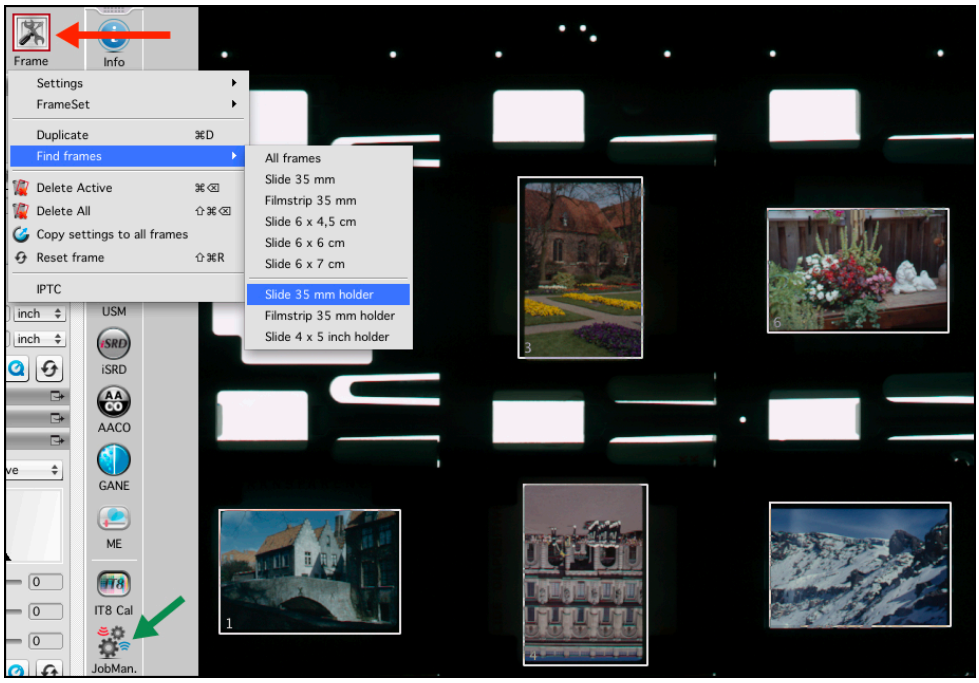


Figure 1.12 Find Frames for Batch Scanning

4. Click the Start button (Figure u1.13, red arrow). This will trigger the **Save As** dialog where you auto-rename the images (Figure u1.14).

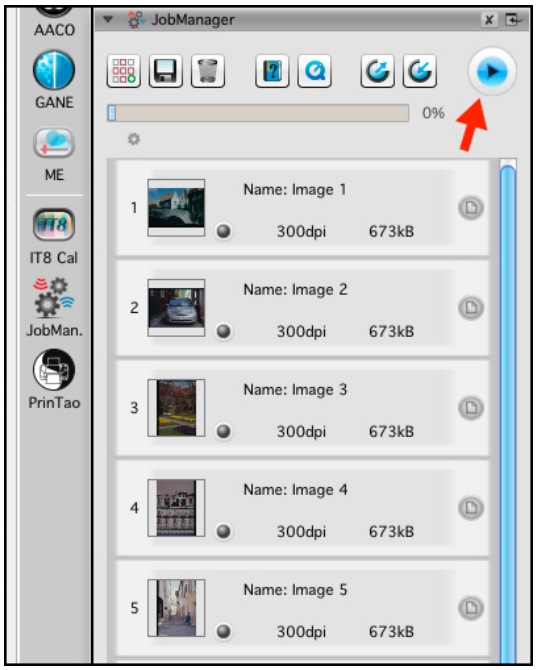


Figure u1.13 Batch Scan Start Command

5. Within the **Save As** dialog (Figure u1.14), do the following:

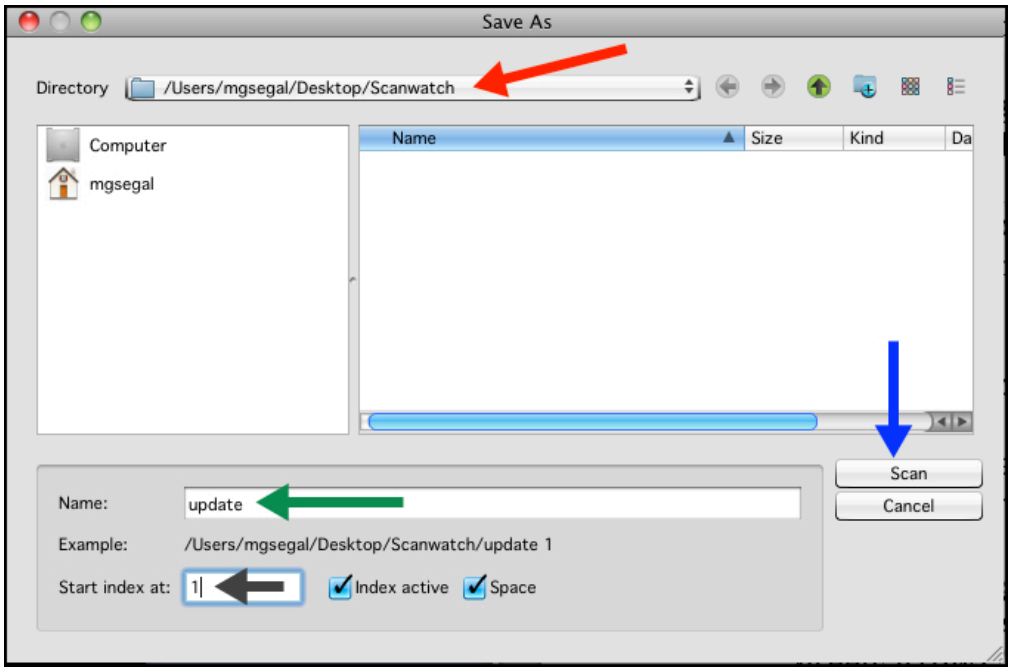


Figure u1.14 Save As Dialog for Batch Auto-Renaming

a. Select the **Directory** and folder (red arrow) where you want the scans to be saved (just in case I wish to further work these images in Lightroom, here I selected "Scanwatch" [4].

b. In the **Name** field (green arrow), enter the name you wish to see replicated with each image that will be scanned (here I entered "update").

c. In the **Start index at** field (black arrow) enter the start number of the numbering sequence that SilverFast will trigger once you begin the scan process.

d. Check the two boxes **Index active** and **Space** if you want the numbering sequence to apply and you want a space between the number and the name.

e. Click **Scan** (button under the blue arrow). The selected images (in our example 5 of them) will scan to the selected destination with the naming automatically done in sequence as shown in Figure u1.15. The name "update" is preserved, while each image is then sequentially numbered as instructed.

For those of you batch-scanning with auto-renaming directly from SF8 into Lightroom (using the automated migration approach described in the book), the images migrated from the "Scanwatch" folder to the "SF8 Output" folder automatically, and then appear in the "Previous Import" window of Lightroom (Figure u1.16).

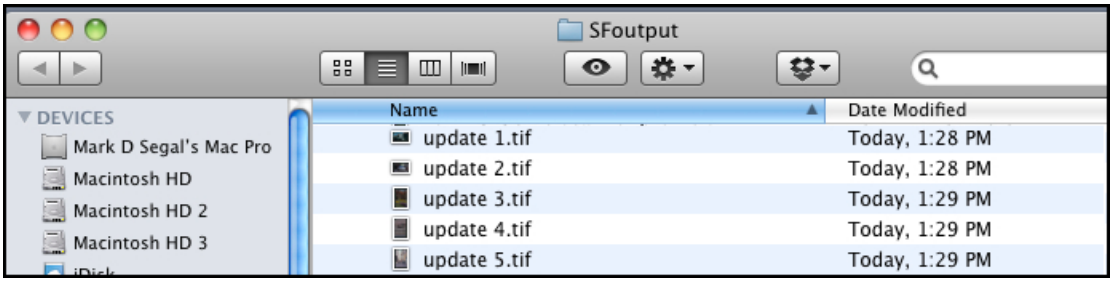


Figure u1.15 Scanned and Renamed Image Files

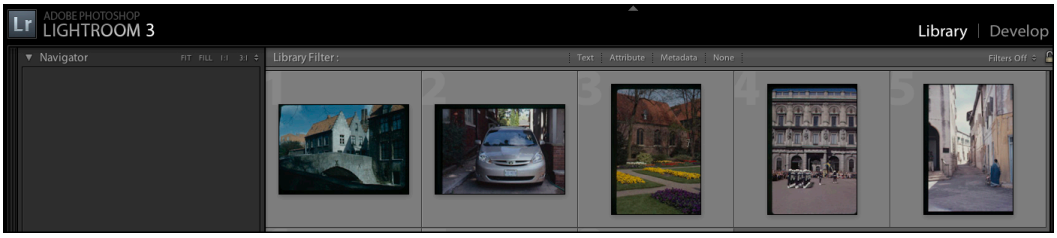


Figure u1.16 Renamed Images Opened in Lightroom (Optional)

[4] As explained in the book, this is my "watched folder" for Lightroom; any image entering this folder will automatically enter Lightroom's "Previous Import" folder when I open Lightroom.

Error Correction

Please refer to the book, page 124 in the “Example”, the phrase “16.5 by 11 inches” should read: “14 by 9 inches”.